THE MICHIGAN RELATIVE RISK TASK FORCE REPORT ON ENVIRONMENTAL EDUCATION

(A Report Submitted to Governor John Engler
as Approved by the
Michigan Natural Resources Commission)

Environmental Education Task Force
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December 1994

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

Stevens T. Mason Building, P.O. Box 30028, Lansing, MI 48909

ROLAND HARMES, Director

The Honorable John Engler, Governor
State of Michigan
Executive Office
P.O. Box 30013
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December 16, 1994

Dear Governor Engler:

On behalf of the Natural Resources Commission, I am pleased to present you with the first of the Relative Risk Task Force reports to result from your 1991 initiated Relative Risk Project. The lack of environmental awareness, the subject of the enclosed Environmental Education Task Force's report, was ranked as a "high-high" relative risk in the state of Michigan in your September, 1992 report entitled *Michigan's Environment and Relative Risk.* The Environmental Education Task Force Report presents a specific plan and recommendations to reduce the environmental illiteracy in the state. The report receive unanimous support of the Natural Resources Commission at its December 8, 1994 meeting.

The following presents the high-points and recommendations of the Environmental Education Report:

1. The report proposes that environmental education not be course specific but rather be integrated into existing math, science, and social studies courses throughout the K-12 program and that it be based on sound science.

2. The report proposes that environmental education be integrated into curricula through the existing 25 Math and Science Centers currently within the state and that each Math and Science Center have the ability to adjust its environmental education program to meet local needs (e.g., urban vs rural vs suburban).

3. The report proposes that environmental education include a large effort to promote awareness of sound pollution prevention practices to help avoid future environmental contamination problems. In addition, and in order to help ensure a balanced perspective, it should also serve as a vehicle to help focus efforts to promote a greater understanding of the need for and benefits of sound management of the state's natural resources (wildlife, fish, forests, land and water).

4. On the state level, the program would be administered by the Department of Natural Resources (DNR) through the office of the DNR's newly legislatively-created Environmental Education Coordinator. A statewide advisory committee, composed of educators, business, private organizations, foundations, private citizens, governmental agencies and other interested parties, would work with the DNR coordinator and provide a state-wide perspective for both formal and informal aspects of environmental education.

5. On the local level, the Math and Science Centers would enter into a contract with the DNR to hire and evaluate local environmental education specialists to administer the program in the respective service areas of the Math and Science Centers.

6. In terms of funding, the Department of Education, through its existing Math and Science Centers, would cover the costs of the overhead for the environmental education specialists, including office space, equipment, clerical support, fringe benefits and most importantly the costs of working with and networking with the local businesses and school districts.

7. The total salaries at its peak for the 25 environmental education specialists is anticipated not to exceed $800,000 per year or about nine cents per Michigan citizen and would be paid out of settlement funds that the DNR obtains from polluters, rather than from new taxes. The settlement fund for this year was $2 million.

8. The report was prepared by representatives from a broad-based group of organizations including the Michigan Chamber of Commerce, Michigan Manufacturing Association, Michigan Chemical Council, University of Michigan, Michigan State University, Michigan United Conservation Clubs, W.K. Kellogg Foundation, Michigan Departments of Natural Resources, Public Health, Agriculture and Education, local high school teachers and the Math-Science Centers.

Should you have any questions regarding the report, please feel free to contact either Dr. James Hill, NRC Commissioner and Chair of the Environmental Education Task Force, or Mr. Keith Harrison, Director of the Environmental Administration Division for the Department of Management and Budget.

The Natural Resources Commission appreciates the opportunity afforded to it to be of service to the state.

Sincerely,

Larry DeVuyst, Chair
Natural Resources Commission

Enclosure

cc: NRC Commissioners
Roland Harmes, Director, DNR
Chad McIntosh, Governor's Office
Dr. William Cooper, MSU
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Environmental Education Task Force Members

EXECUTIVE SUMMARY

The Michigan Relative Risk Analysis Project, commissioned by Governor John Engler, funded by the U.S. Environmental Protection Agency, and administered by the Michigan Department of Natural Resources (MDNR), concluded in its July, 1992, report that the lack of environmental awareness (environmental illiteracy) was one of six issues that pose the highest relative risk to Michigan's future. In the fall of 1993, the Natural Resources Commission (which was designated by the Governor as the lead agency for the Relative Risk Project) authorized the creation of the Environmental Education Task Force to address the lack of environmental awareness issue.

The Environmental Education (EE) Task Force was specifically charged by the Chair of the Natural Resources Commission (NRC) to "take the lead to develop the recommendations listed in the (MDNR Environmental Action Plan issued in March of 1993 by the EE Coordinating Committee) into a program that can be administered by the Department of Education and supported as appropriate by the Department of Natural Resources." The MDNR Director stated that an expected outcome of this Task Force would be to give the MDNR "the opportunity to adjust and change where necessary, the way we manage our programs to address issues that are critically important to improve and enhance the utilization and conservation of the natural resources of this state."

Accordingly, the Task Force formally met in lengthy sessions beginning December 10, 1993 and concluding on June 14, 1994 to develop an environmental education plan

consistent with the NRC charge. The Task Force, which included representatives of the 1993 EE Coordinating Committee and its predecessor the Environmental Education Citizen's Advisory Committee, as well as representatives from industry, education, state agencies, and private organizations/foundations, examined past EE plans as well as the obstacles that currently exist to developing an EE program in Michigan.

Four major obstacles that the Task Force identified as necessary to be overcome were:

(1) conceptual barriers

(2) attitudinal barriers

(3) logistical barriers, and

(4) funding barriers.

The Task Force then concluded that a successful Michigan EE plan would require the following basic elements:

(1) A plan with EE goals that focus not just upon K-12 EE curriculum issues and the need for training EE teachers, but also upon the environmental awareness needs of all of Michigan's citizens (including business, private foundations, agriculture, educational administrators, government agencies, universities, and the public in general),

(2) A plan that places the primary responsibility for delivering formal environmental education on the Michigan Department of Education (MDE), with the MDNR through its coordinator, playing the key role in coordinating the non-formal or lifelong aspects of EE.

Such a plan should have a delivery system that has significant local input and the flexibility to respond to the specific local and regional priorities, mirroring the local control characteristics of Michigan's school districts,

(3) A plan whose resources are focused primarily upon identifying the significant existing collections of EE materials, professionally analyzing and packaging these materials in a balanced and user friendly fashion for formal curriculum as well as for non-formal EE purposes, and disseminating this material to the widest possible state audience so as to make these materials easily accessible to teachers, organizations, and citizens alike. The Task Force believes that in light of limited state revenues, expenditures for developing new EE materials should be a low priority,

(4) A plan whose aim is to assist in the coordination of the many useful but fragmented existing EE programs and training opportunities, both at the state level and in the private sector, in order to maximize their usefulness as well as to communicate the availability of these activities to all the citizens of the state. The focus of EE efforts in a statewide plan should be to provide a resource coordinator who can supplement and otherwise offer coordination assistance to private and state agency EE-related programs, along with supplying technical assistance and resources wherever appropriate.

(5) A plan that establishes a statewide advisory committee composed of educators, business, private organizations and foundations, private citizens, government agencies,

and other interested parties to provide a state-wide perspective for both the formal and non-formal aspects of EE. Such a committee would assist in the development of cooperative and coordinated approaches to EE among the many private and government stakeholders, as well as to create a mechanism for studying and proposing improvements in the current formal education process associated with EE.

(6) A plan that provides a balanced and stable source of funding to assure that the long-term EE goals of the state, especially in the area of formal K-12 education, are realized.

The plan was presented for comment at four public meetings during the month of October, 1994. In addition, comments were received from various organizations during the period October through December, 1994 (see Appendix K). The plan was unanimously approved and forwarded to the Governor by the NRC in December, 1994.

SPECIFIC TASK FORCE RECOMMENDATIONS

The following recommendations were made by the Task Force:

1. The EE goal of the 1992 Citizen's Advisory Committee (the basis for the EE Coordinating Committee action plan) should be modified to express the need for a balanced and interdisciplinary short-term and long term environmental perspective.

2. The EE definition adopted by the EE Coordinating Committee should be replaced by one that stresses the interdisciplinary nature of EE, the need to address specifically in the definition the human influences as well as the natural state of the environment, and the importance of developing and promoting problem-solving, inquiry, and decision-making skills in the citizenry.

3. The EE plan should address explicitly the distinct needs of three major EE stakeholders -- educators, citizens, and business/agriculture -- in the following ways:

Educator needs:

(a) Inventory the existing collections of EE materials, evaluate these materials for purposes of accuracy and quality, and develop a plan for utilizing and disseminating this information for use in a statewide EE program.

(b) Identify the EE objectives associated with the state's core curriculum requirements under P.A. 25 and the recently passed P.A. 335, especially as they related to math and science subject matter, and package the EE materials identified in (1) to meet these objectives to assist teachers and education administrators in meeting state educational requirements. Grants to teachers, universities, and private parties is one way to achieve such a packaging of EE material.

(c) Help coordinate and disseminate EE information, as well as assist in materials development for EE-related programs conducted by such organizations as the math and science centers, 4-H, Agricultural Extension Service, the FFA, and the Groundwater Education in Michigan program in order to facilitate the delivery of educator training programs consistent with state EE goals.

(d) Establish an EE Advisory Committee, consistent with the goals and membership characteristics of Public Act 310 of 1994, in order to evaluate and provide oversight of the state EE program, to evaluate the formal EE training needs for educators and explore such formal EE issues as certification, course training in EE methodology, and to the development of an EE scope and sequence model as a framework for incorporating EE into local educational needs, and to avoid duplication or fragmentation of EE efforts and to increase private-government cooperation and joint sponsorship of EE training programs.

Citizen Needs:

(a) Maximize state agency EE efforts by coordinating with state agency representatives on the EE Advisory Committee to more efficiently use limited resources to educate citizens on environmental issues via delivery of timely, non-biased materials and public service announcements.

(b) Utilize the MDNR EE coordinator established under Public Act 310 of 1994 to work with universities, private organizations, state agencies, and trade associations to develop and regularly update an EE organizational speaker resource list for providing citizens and local units of government with access to expert speaker resource information associated with EE-related issues.

(c) Establish as one of the duties of the DNR EE coordinator to provide timely information on planned EE-related conferences, the availability of EE materials, and other EE-related activities of interest to citizens by using key environmental and trade association newsletters as a promotional tool (the creation of a "newsletter network") as well as computer-based bulletin boards. Such information should be included in the MDNR calendar.

(d) Enhance EE visibility in park interpretive programs, local recreation areas, private EE training programs (including hunting and fishing education programs) by making available to these entities materials such as EE-related videos and agency environmental white papers, as well as authorize the MDNR coordinator to administer small grants to support citizen EE-related workshops.

Business Needs:

(a) The MDNR should facilitate the dissemination of information on success stories where business and agriculture have successfully integrated environmental considerations into their operations, and refer inquiries from businesses seeking to duplicate such efforts to chambers of commerce and trade associations for advice and further information.

(b) The MDNR, through its new Technical Services Division, should maintain a calendar/list of all scheduled regional conferences on integrating environmental and economic considerations for reference by interested businesses, as well as to help reduce conference scheduling and topic duplication.

(c) High-level business and agriculture participation is strongly encouraged on the EE Advisory Board as well on math and science advisory center boards in order to ensure that economic perspectives are properly reflected in the development of EE materials and training, as well as to stimulate financial support for funding EE training and materials dissemination costs via hands-on business and agriculture EE program involvement.

(d) Consider legislation offering tax credits for businesses and private organizations and foundations which financially support state EE programs enacted to encourage the financial involvement of small businesses in EE efforts.

4. Develop a means of improving the logistics of coordinating EE materials and instruction.

(a) Utilize the 25 statewide math and science centers operating under the auspices of the MDE as a major delivery system for educator training and formal EE information dissemination, along with such existing programs as the MUCC's WISE program, Project WILD among others. Create by contract the position of EE specialist in each of the participating centers in order to handle the EE activities of that regional service area of the state.

(b) Utilize the EE Advisory Committee (see Public Act 310 of 1994) in conjunction with the MDE and the MDNR coordinator to develop an evaluation plan for improving current formal EE curriculum and activities and to act as a central entity for facilitating EE information coordination, collection, dissemination, and evaluation.

(c) Utilize the MDNR coordinator to:

(1) implement the EE Advisory Committee recommendations;

(2) inventory existing EE collections;

(3) coordinate state agency EE activities;

(4) facilitate EE conferences and training;

(5) act as a contact person for math and science centers and other existing EE-related organizations for the delivery of EE material, training, and coordination; and

(6) facilitate the development of annual workshops bringing business,

foundations, educators, and state agencies together to discuss ways of improving EE information and education efforts.

5. Develop a funding source for operating an EE program in Michigan.

(a) The Task Force recommends that the MDNR and the NRC commit funds recovered from legal enforcement actions, particularly funds from penalty mitigation settlements as well as economic deterrent and economic penalty funds, in order to pay for contracting the services of EE specialists in the math and science centers.

(b) The MDNR coordinator position should be developed consistent with the position described in Public Act 310 of 1994, should be established to solely handle EE, and should be funded by the MDNR general budget and not from EE funds.

(c) Business, agriculture, foundations, and other organizations are to be encouraged to help support math and science and EE-related coordination and information dissemination efforts. The Task Force recommends that the legislature consider tax credits to increase small business participation and funding of these activities.

(d) The MDNR EE coordinator should be the chief coordinator of all federal and state EE-related grant proposals within the MDNR, with responsibilities not only to write EE grant proposals but also to be consulted on all EE-related grant proposals developed within the MDNR. EE Advisory Committee

agency representatives should also consult with the MDNR coordinator on proposed EE grant proposals.

OVERVIEW OF THE MICHIGAN RELATIVE RISK ANALYSIS PROJECT

In July of 1992, the Michigan Relative Risk Analysis Report was published and released for public review. Through the efforts of Governor John Engler, the Michigan Department of Natural Resources (MDNR), and Public Sector Consultants and through funding from the U.S. Environmental Protection Agency, the report provided a new perspective for addressing statewide environmental challenges and identified and ranked the most pressing residual risks (that is, the risks remaining after considering the effects of current controls) facing Michigan.

The report identified 24 residual risks and ranked six of them as posing the highest relative risk to Michigan's future. Lack of environmental awareness (environmental illiteracy) ranked as one of the six highest risks to the state, and rightly so. As the report's white paper (see Appendix B) on lack of environmental awareness concludes: "Understanding how we live in a world that is linked economically and ecologically as well as politically is essential to meeting human needs in the 21st century and beyond."

The report's white paper also outlined some of the challenges facing any environmental initiative when the citizenry fail to understand the linkages between human welfare and the environment. It discusses the relative exclusion of environmental concerns from our current education and the need to reintegrate environmental thinking into our education. It further highlighted the problems of fragmentation of state environmental education efforts, the lack of state EE leadership, the problems of finding quality EE information, and the difficulties associated with coordinating programs,

opportunities, and activities so they are easily accessible to the citizens of the state. In recent years, efforts have been undertaken to address the issue of environmental awareness through two important environmental education (EE) initiatives. A report issued on February 25, 1992 by the Environmental Education Citizen's Advisory Committee to the Michigan State Board of Education and the MDNR was one such initiative. The Committee, appointed in 1991 by the MDNR Director and the State Superintendent, was charged to perform four tasks:

1. Develop a statement of philosophy on environmental education to be adopted by the Natural Resources Commission (NRC) and the State Board of Education,
2. Identify the necessary and critical components of a practical, effective, and coordinated approach by state government toward the instruction of students about the history, current status, and future trends of environmental protection and resource management in Michigan,
3. Identify methods by which environmental education can be fully integrated into the curricula of public schools in Michigan, while also identifying the difficulties and impediments to this full integration, and
4. Develop recommendations for steps that each department can take to overcome these impediments and resolve the difficulties identified in step 3.

A copy of the committee's thorough report, including its recommendations, is attached as Appendix D of this report. The committee's efforts provided the groundwork

for the creation of a second committee by the MDNR Director, the Environmental Education Coordinating Committee. The Director charged this new committee to develop an EE action plan to ensure that the MDNR was efficiently and effectively involved in enhancing EE in the state.

The Coordinating Committee presented its well-considered recommendations to the Natural Resources Commission, which adopted the committee's plan on March 26, 1993. A copy of the plan, (which included among its recommendations a call for a MDNR EE coordinator, an EE Advisory Board, and more coordinated EE activities within the MDNR) is also included in the Appendix C of this report.

In the fall of 1993, NRC Chair Larry DeVuyst appointed NRC Commissioner James Hill to chair a task force charged with taking the recommendations of the Governor's Relative Risk Task Analysis Report as they relate to the lack of environmental awareness and those of the EE Coordinating Committee's EE Action Plan and "develop a program that can be administered by the Department of Education and supported as appropriate by the Department of Natural Resources" (See Appendix A).

MDNR Director Roland Harmes further outlined the importance of the task Force in an August 25, 1993 memorandum to the NRC and the MDNR indicating that, "This project gives us an opportunity to adjust and change where necessary, the way we manage our programs to address issues that are critically important to improve and enhance the utilization and conservation of the natural resources of this state" (See Appendix A).

CREATION OF THE RELATIVE RISK ENVIRONMENTAL EDUCATION (EE) TASK FORCE

Members on the EE Task Force that were invited included representatives of all interested parties to the EE issue. Representatives from K-12 education, universities, business and industry, government, the legislature, the Michigan United Conservation Clubs, and foundations all gave generously of their time to respond to this challenge. Several of the Task Force members had served as members of the 1992 Citizen's Advisory Committee or were members of the EE Coordinating Committee, adding continuity to the Task Force's efforts. A list of participants is included in the Appendix I. The Task Force first met on December 10, 1993 and held committee meetings through June 14, 1994. The Task Force initially addressed the definition and scope of the EE problem, and then separated into interest group subtask forces to address EE from their own organizational perspectives. Subsequently, after a review of past EE reports and articles was completed, the identification of the general barriers to a successful EE program in Michigan was developed, followed by the development of a series of options for overcoming each of the barriers.

Four barriers were identified by the Task Force:

1. **A conceptual barrier: the lack of consensus about the scope and content of EE.**

This barrier was addressed by developing a consensus among Task Force members as to the definition of EE and the goals of EE in Michigan. The

consensus required some rephrasing of the goals and definitions of the two previously mentioned committees, but it was necessary in order to develop a plan that melds the interests of all of the affected parties.

2. **An attitudinal barrier: the lack of understanding by the educators/administrators, citizens, and by business/agriculture as to the importance of EE, leading to a perception that EE is not a legitimate or at least not a significant educational subject.**

This barrier was addressed by breaking EE into a long-term K-12 issue as well as an issue of meeting the needs of three important EE stakeholders: educators, citizens, and business/agriculture.

3. **A logistical barrier: the perceived lack of instructional time; classroom-ready instructional materials, equipment, and other resources; and coordination of EE materials and instruction.**

This barrier was addressed by focusing upon the use of newly created and legislatively funded math and science centers (administered by MDE) as the primary delivery mechanism for formal EE education with the MDNR coordinator focusing much of his/her efforts on coordinating non-formal EE efforts.

4. **A funding barrier: the lack of a stable source of funding for EE programs and coordination efforts.**

This barrier was addressed by reference to promoting collaborative private-public efforts, funding under Public Act 310 of 1994, government and private grants, and polluter settlement funding.

Strong support for the use of existing math and science centers as the primary means of formal EE teacher training and EE curriculum materials coordination and dissemination was evidenced by Task Force members, who particularly preferred the linkage between math and science and EE, as well as total state coverage by the 25 regional centers. This Task Force support led to discussions with MDE representatives and math and science center representatives, all of whom endorsed the concept of using the centers as the key formal EE delivery mechanism, hiring an EE specialist for each center to coordinate the needs for that center's regional audience.

The Task Force then examined Public Act 310 of 1994 and reacted favorably to the development of a MDNR coordinator to handle non-formal EE issues and the creation of a representative Advisory Committee to coordinate statewide EE efforts along the lines described in Public Act 310 of 1994.

Finally, the Task Force reviewed each of the options for overcoming the previously mentioned barriers and developed a list of recommendations that form the basis for this report.

AN ENVIRONMENTAL EDUCATION PROGRAM FOR MICHIGAN:

A narrative of the EE Task Force's recommendations

The recommendations adopted by the Task Force in this report present a blueprint for developing an environmental education plan for Michigan involving the MDE, the MDNR, and a myriad of organizations and agencies across the state. Drawing upon the extensive efforts of past EE committees and the Governor's Relative Risk Project, the recommendations of this report establish the basis for a comprehensive and coordinated environmental education program that has long been lacking in Michigan in order to rectify the risk that environmental illiteracy poses to the future of the state.

In essence, the Task Force recommendations represent a "back to the basics" approach to EE, focusing upon the elementary "ABC's" of an EE program. The A's of this plan are the need for Agency cooperation in EE efforts; Analysis of existing EE instruction and materials to ensure consistency and usefulness in meeting the objectives of a quality EE program; and Applicability of EE efforts to meet the needs of All the citizens of the state.

The B's of this plan are an emphasis on Business involvement in EE programs, removal of Bias in the presentation and development of EE materials and programs, and promotion of a Balanced approach to EE, incorporating economic and scientific as well as natural considerations into EE programs.

The C's of the plan are an emphasis on Coordinating both existing EE information and tailoring it to reflect established state educational objectives as well as existing EE

programs and instruction at the state and local levels to make more efficient use of scarce resources and avoid the fragmentation and duplication problems that currently plague many EE efforts, improving Cooperation among all EE stakeholders to obtain a unified philosophical and financial commitment to EE, and Correlation of EE materials at the K-12 level to Core Curriculum objectives.

Three key elements of the plan demonstrate how the Task Force perceives these ABC's can be efficiently achieved:

(1) Creating EE specialists at math and science centers to coordinate educator EE training, inventorying existing EE materials, and developing integrated programs that are both relevant and useful to the center's regional population,

(2) Utilizing a MDNR coordinator to coordinate non-formal aspects of EE among state agencies as well as assist in improving EE information dissemination for private organizations and citizens, and

(3) The creation of an EE Advisory Committee to oversee and evaluate these efforts as well as serving as a representative forum for proposing additional reforms to the EE program as they arise.

What follows is a discussion of the Task Force's recommendations of ways to overcome the four barriers to EE that were summarized earlier in this report. The recommendations offer an approach which the Task Force believes can move the EE agenda forward in the state after decades of inadequate state leadership in EE.

Barrier 1: The lack of consensus as to the scope and content of environmental education.

While there are numerous definitions to choose from and predecessor EE committees have amply explored this question, the Task Force decided to develop a formal definition that specifically identifies the importance of human influences on nature as well as the ties EE has to science and math methodologies. Accordingly, for purposes of defining EE, the Task Force endorsed a slightly modified 1993 definition offered by John Disinger in the First Report of the National Advisory Council on Environmental Education, namely:

> "Environmental education is the interdisciplinary process of developing a citizenry that is knowledgeable about the total environment - including both its natural state and **human influences on nature** - that has the capacity and the commitment to engage in inquiry, problem-solving, decision-making, and action that will assure environmental quality."

The Task Force felt that the definitional terms "interdisciplinary", "human influences on nature", and the "problem-solving" definitional aspects of EE would address industry concerns relating to the promotion of a balanced approach to EE.

In addition the Task Force also recommends slightly modifying the goal of EE in Michigan, which was included in the Citizens EE Advisory Committee report, by removing the phrase "foster their environment and use its resources in a wise and prudent fashion." and replacing them with the words " manage its resources from a balanced,

interdisciplinary perspective for the best interests of present and future generations." Thus the goal of EE in Michigan would become:

> "To develóp an environmentally responsible citizenry. Environmental responsibility must begin by empowering people, individually and collectively, to address environmental issues, whether they live in urban, suburban, or rural communities. Environmental education will enable individuals to understand the connection between themselves, air, land, water, and other living things as well as know how these systems relate to the global environment. At the same time EE will make it possible for individuals to protect, conserve, and manage its resources from a balanced, interdisciplinary perspective for the best interests of present and future generations."

The reason for this change was the Task Force's belief that the state's EE goal should explicitly express the management aspects of EE, as well as express the need to recognize the present economic needs of society when environmental issues are at stake. It is clear that no environmental education component is complete if consideration of the economic aspects of environmental issues are not clearly incorporated into an EE issue.

With the adoption of these two definitions by the diverse interests represented on the EE Task Force, the conceptual barrier to an EE program (i.e., the lack of consensus about the scope and content of EE) was addressed head-on. There was also a

consensus among EE Task Force members that a state EE program must be not only a K-12 issue but also a life-long learning process as well if the state is to develop an environmentally responsible citizenry.

Barrier 2: The lack of understanding by educators/administrators, citizens, and business/agriculture as to the importance of EE, leading to an overall perception that EE is not a legitimate or at least a significant educational subject.

The Task Force addressed the second barrier to an EE program in Michigan as an attitudinal barrier; namely, the need for such a program to identify the short and long term needs of all of Michigan's citizens. In particular, the environmental awareness needs of three stakeholder groups were identified: educator needs, citizen needs, and business/agriculture needs.

Educator Needs

(1) The Task Force recognized the basic educator training needs in terms of (a) providing easily accessible and useful EE training opportunities for educators, and (b) better acquainting educators with excellent existing programs sponsored by organizations as diverse as 4-H, GEM (Groundwater Education in Michigan), Soil Conservation Districts, Intermediate School Districts, the Agricultural Extension Service, and nature centers; promoting and supporting their efforts.

In terms of meeting (a), the Task Force concluded that the 25 math and science centers, which now service all of the state and provide math and science training and information services for the regions they represent, are an ideal mechanism for the

delivery of educator EE training (see Appendix F).

The Task Force was particularly impressed by the local input that each center has or is fostering with local businesses, foundations, and local citizens, as well as the statewide network that these centers have created for sharing math and science information. Also important is their ability to tailor information to the special needs of the center's regional constituency, including the local school districts. Furthermore, the strong linkage between EE objectives and math and science objectives in the state's core curriculum make the centers a natural place to begin the integration of EE into the classroom.

The Task Force recommends that this math and science alliance would best be served by hiring an EE specialist for each of the participating math and science centers through funding from the MDNR, government grants, and increased private business and foundation support for the existing centers. These EE specialists would handle the EE training and EE materials and program development in each center's regional constituency. The EE specialist would be hired by a contract developed by a statewide EE Advisory Committee and administered by the MDNR coordinator. The contract would stipulate the EE activities to be performed by each specialist and how their performance would be evaluated for contract renewal purposes. It is expected that during the first year of operation, the chief task of the EE specialists would be to develop a directory/inventory of all the existing EE collections and training programs in the state, evaluate the quality of existing EE materials and devise methods for packaging them in ways useful and easily accessible to educators, and devise a uniform delivery system to coordinate EE

materials dissemination and training programs through the math and science center for use by educators statewide.

In terms of meeting (b), the Task Force recommends that the math and science centers promote and assist private training programs in order to increase public awareness of and participation in the many private EE training opportunities now available as well as co-sponsoring some regional training programs.

(2) The Task Force recommends supplementing the EE materials development responsibilities of the EE specialists in 1(a) with grants to universities, education specialists, and private organizations to devise ways of packaging existing EE materials so as to meet the state's core curriculum requirements (including P.A. 25 and the recently passed P.A. 335), especially as they relate to math and science objectives (see Appendix E for list of EE objectives associated with Michigan's Essential Goals and Objectives for Science Education). It is expected that tying EE to the state core curriculum objectives will make it easier for educators and education administrators alike to adopt EE as a useful and relevant tool for meeting state education requirements.

(3) The Task Force recommends that a representative EE Advisory Committee be formed to study the need for additional EE training for current and future educators in terms of state teacher certification requirements. Development of continuing education workshops, university courses in methodology for incorporating EE into the sciences and social sciences, and particularly the development of a scope and sequence model for EE

in K-12 on a statewide or Great Lakes level would be areas this committee should explore to ensure a quality EE program to meet the growing challenges that a lack of environmental awareness poses to the state's future. The scope and sequence model would detail the concepts and skills which students will need to master in order to make decisions about environmental issues as well as to provide a framework that can be used by educators, curriculum developers, and subject specialists in developing and incorporating EE into their local educational needs. The committee would also create a forum to provide statewide leadership for the EE program, to help reduce duplication and fragmentation of efforts among EE stakeholders, and to increase stakeholder cooperation and sponsorship of EE activities.

Citizen Needs

(1) The average citizen receives numerous EE messages from various state agencies via public service announcements or press releases that are neither coordinated nor sometimes even consistent. The Departments of Agriculture and Public Health, along with MDE and the MDNR all offer some form of EE for the general public, which oftentimes are developed in a vacuum in terms of trying to send a uniform EE message. The Task Force recommends that state agency representatives serving on an EE Advisory Committee (similar in composition to that recommended under Public Act 310 of 1994 in the Appendix G of this report) maximize their EE efforts and more efficiently use their limited resources by coordinating their respective agencies' EE efforts through prior consultation with other state agencies represented on the EE Advisory Committee. This effort will assist in delivering the public timely, unbiased, and more comprehensive

materials and public service education announcements.

(2) The Task Force recognizes that the lack of a central EE resource base hinders the dissemination of EE information. Because of the tremendous amount of EE material now in existence, cataloging the existing collections of EE materials to be tapped by math and science centers for educator purposes is only one way to meet this need. Accordingly, the Task Force recommends that the MDNR coordinator develop, maintain, and update an EE organizational speaker list for use by citizens when they seek expert speakers on pressing environmental issues. The list (which would be widely disseminated through Centers and public libraries, among other channels) would identify organizations that make available to the public expert speakers on specific environmental issues, as well as a contact person in each participating organization who would arrange speaker availability.

(3) The Task Force recommends that the MDNR coordinator assist in the creation of a newsletter network (a collection/listing of all the key trade association and environmental newsletters), whereby current and proposed EE-related conferences, EE materials availability information, and other EE-related activities could be transmitted in a timely manner, as well as have this information included in the DNR calendar. This network would require the up front effort of identifying all the relevant newsletters and devising an efficient means of transmitting EE-related information to these newsletters in a timely and cost-effective manner. Attempts would also be made to use various computer bulletin boards as a dissemination mechanism.

(4) The Task Force also believes that park interpretive programs and local recreation areas are excellent vehicles for increasing the environmental awareness of the public. Accordingly, the Task Force recommends that EE-related videos and other EE-related materials, including environmental issue white papers developed by state agencies, be made available to these recreation programs. In addition, small grants approved by the Advisory Committee and administered by the MDNR coordinator for citizen EE-related workshops in these areas should also be made available to assist in the development of such excellent programs as the Grand Traverse Bay Watershed Initiative and other local partnership efforts (see Appendix J).

Business Needs

(1) The Task Force believes that communication of how businesses have successfully integrated environmental considerations into their economic activity is a valuable EE tool for increasing educational awareness in business and agriculture. Accordingly, the Task Force recommends that the MDNR assist in identifying these "success stories" and encourage business organizations like the Chamber of Commerce and the Michigan Manufacturers Association to communicate these stories to their membership through their respective newsletters. Trade associations could serve not only as the initial contact point and information resource for businesses seeking advice on how to duplicate such efforts, but could also maintain a list of case materials as well as the addresses and telephone numbers of specific contact persons within a company who can provide more detailed information as to how the company successfully integrated environmental considerations into its operation.

(2) The Task Force also recognizes that there is a lack of coordination in the development and scheduling of environment-related business programs, resulting in duplication of effort or schedule conflicts. To promote such conferences and maximize limited conference resources, the Task Force recommends that the MDNR maintain a central calendar/list of all scheduled environment-related conferences for reference by program sponsors as well as prospective conference planners.

(3) To ensure that a business perspective is an integral part of the state EE training and materials coordination effort as well as to develop a strong bond between business and the state EE program, the Task Force strongly believes that the EE Advisory Committee business representatives should include executives who are in a position to commit their organization to EE activities as well as make financial contributions to the EE program. Business involvement is crucial to the success of a state EE program, and their economic perspectives as well as financial support are indispensable elements of any EE program.

(4) That the Michigan Legislature consider offering tax credits to small businesses who financially support state EE programs in order to establish a broad financial base for the EE program and increase small business influence and involvement in the EE program.

Barrier 3: Developing a means of improving the coordination of EE materials and

instruction.

The Task Force proposes three entities to improve coordination of EE materials:

(1) Utilization of the math and science centers which cover the entire state and operate under the auspices of the MDE would satisfy the dual objectives of comprehensive and coordinated coverage of formal EE training and materials, as well as maintaining MDE as the lead agency in the formal education elements of the proposed EE program. The hiring of well-trained EE specialists in each participating center would ensure that the EE function will receive the necessary attention, as well as provide a distinct EE contact for each region of the state to meet the personal needs of local educators.

(2) Utilization of the MDNR coordinator primarily for non-formal EE education purposes would help coordinate otherwise fragmented non-formal EE activities at the state and private level, as well as centralizing efforts to identify, collect, and disseminate information on EE-related programs, activities, and materials. It would also provide a central resource person to implement EE programs and directives of the EE Advisory Committee.

(3) Creation of an EE Advisory Committee constituted along the lines identified in Public Act 310 of 1994 would provide a representative and central coordinating body to oversee both the formal and informal aspects of the state's EE program. It acts as a central entity to develop proposals for improving the current formal efforts as well as

providing oversight responsibility for evaluating the quality and usefulness of EE information dissemination and coordination efforts.

Barrier 4: The need to develop a permanent source of funding for operating the state EE program.

The Task Force identified funding as one of the most difficult issues to resolve in terms of ensuring the success of the proposed EE program. The Task Force made five financial recommendations to implement the proposed EE program:

(1) Funds derived from environmental penalty mitigation settlements, including penalties imposed for economic benefit and punishment purposes, could be combined with the fund created under Public Act 310 of 1994 and used to help pay for the costs of hiring EE specialists at the math and science centers. This non-general fund source should be utilized for the benefit of all by helping to educate the citizenry in order to prevent future contamination problems. As a preventative strategy, use of these funds for EE purposes represents the highest and most efficient use of these settlement funds.

(2) The Task Force recommends that funds authorized under Public Act 310 of 1994 be used to help support the coordination and dissemination efforts of the MDNR coordinator.

(3) The Task Force recommends that the MDNR coordinator job position be

strictly limited to EE activities and should avoid new responsibilities being imposed upon the coordinator that take away the primary EE focus of the position. The demise of the education function in the MDNR in recent years makes this recommendation an important one for maintaining a useful and high profile EE coordinator.

(4) The Task Force recommends that business, agriculture, foundations, and other organizations be included in all aspects of the state EE program with the expectation that these organizations will help support the state EE program. Tax credits for small business contributors are but one of many additional ways to provide economic incentives for such support.

(5) Finally, the Task Force recommends that the MDNR coordinator be the chief coordinator of all federal and state EE grants within the MDNR. The position's responsibilities should include not only writing EE grant proposals but also serving as a consultant on all EE-related grant proposals developed within the MDNR. Agencies represented on the EE Advisory Committee are also encouraged to consult with the MDNR coordinator prior to submitting EE-related grant proposals in order to coordinate grant activities, avoid duplication or unnecessary grant competition among agencies, and enhance the quality and strength of the grant proposal by seeking joint agency sponsorship of EE grant proposals.

CONCLUSIONS

The Task Force presents this plan for reducing the risks to the state posed by a lack of environmental awareness as a starting point for moving EE from the drawing board to the local school boards and the corporate boards with the involvement and collaboration of key organizations statewide. The plan represents a first step in a very complex, comprehensive process of laying the groundwork for attitudinal and behavioral changes towards EE.

This plan, developed by consensus from a broad group of Task Force stakeholders, promises to create a state EE plan that will confront the major problems of past EE efforts and overcome them by virtue of the plan's appealing simplicity, its utilization of existing infrastructures in the math and science centers, and its focus on tapping existing EE resources rather than incurring the expense of creating new EE materials and programs. These basic elements of the plan are certainly consistent with the principles of good stewardship when utilizing the state's limited financial resources.

Furthermore, the plan's focus on cooperative relationships with state agencies and private enterprise in order to achieve EE objectives, the flexibility of the plan which can deliver EE resources to schools from math and science centers which are sensitive to local needs, and the fact that no additional general fund resources need to be tapped nor significant new legislation needs to be passed to implement this program should appeal to those who may be concerned that an state EE program means the creation of another costly and inflexible government bureaucracy (see the Appendix H for a copy of a recent

Detroit News editorial on EE indoctrination).

To conclude, the Task Force believes it is time to stop talking about the need for a state EE program and begin its implementation in order to reap the tremendous benefits that an environmentally aware citizenry creates. As the key agency identified to implement the Governor's Relative Risk Project and as the primary guardian of the state's natural resources, the MDNR is ideally suited to lead this EE effort. The Task Force offers this plan as a practical and effective way for the MDNR to play a key role in promoting EE across the state through coordinated efforts among a variety of organizations and agencies committed to EE.

APPENDICES

A - EE Task Force Charge - NRC and MDNR memoranda

B - Relative Risk White Paper on the Lack of Environmental Awareness

C - EE Action Plan (1993)

D - EE Citizens Advisory Committee (1992)

E - EE Objectives and Michigan Essential Goals for Science Education

F - Math and Science Background Material

G - Public Act 310 of 1994

H - Detroit News Editorial

I - EE Task Force Membership

J - The Grand Traverse Bay Watershed Initiative

K - Letters of Support

Appendix A

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES
Stevens T. Mason Building, P.O. Box 30028, Lansing, MI 48909

ROLAND HARMES, Director

August 25, 1993

Mr. James Hill
Natural Resources Commission
1359 Tomah Drive
Mt. Pleasant, MI 48858

Dear Jim:

I am appointing you to chair a task force on Environmental Education for the Natural Resources Commission. I have attached a copy of the recommendations made in the Relative Risk Assessment Project, as well as those from the Department of Natural Resources.

I have asked Director Harmes to assign DNR staff as appropriate to work with you on this very important issue. Please take the lead to develop the recommendations listed in the attached documents into a program that can be administered by the Department of Education and supported as appropriate by the Department of Natural Resources.

I appreciate your willingness to lead this effort, and look forward to your reports to the Commission at its future meetings.

Sincerely,

Larry DeVuyst, Chairman
Natural Resources Commission

Attachment

cc: Natural Resources Commission
Roland Harmes
Deputy Directors
Dave Freed
Chad McIntosh
William Cooper

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

August 25, 1993

TO: Natural Resources Commission ✓
Deputy Directors
Division/Office Chiefs

FROM: Roland Harmes, Director

SUBJECT: Relative Risk Implementation Process

The information you have received to date regarding the Relative Risk Analysis Project has identified various issues and recommended courses of action that the Department and the Commission should take.

In order to ensure the changes necessary for the Department of Natural Resources to begin developing processes and altering programs to reduce the risks identified in the documents you have, we will use the team approach to address each of the issues involving the Department.

As these issues and recommended actions are sent to you for review, I will be asking Commissioners and/or Department staff to lead the teams to identify the steps to reduce the identified risk. Each team will be charged to develop its recommendations in draft form, as did the Oil and Gas Task Force, and submit them to me for review by the Deputies, Division Chiefs and Commission.

After this review, the matter will be referred back to the team chair person. The team will hold a minimum of four public meetings and then report back to me a final set of recommendations.

I am assigning Mr. David Freed, with assistance from Mr. John Shauver, to work with each team to insure that when recommendations overlap, that the teams meet and resolve any differences or overlap before draft recommendations reach my desk. I have promised Chairman DeVuyst our staff support and cooperation for the issues he must address with other Departments.

I appreciate your support to date and thank you for your staffs' efforts on this project. This project gives us an opportunity to adjust and change where necessary, the way we manage our programs to address issues that are critically important to improve and enhance the utilization and conservation of the natural resources of this state. I look forward to working with everyone in this exciting opportunity. Thank you.

Rollie

cc: Dave Freed
Chad McIntosh
William Cooper

Appendix B

LACK OF ENVIRONMENTAL AWARENESS (ENVIRONMENTAL LITERACY)

> *The Earth does not belong to us; we belong to the Earth. All things are connected, like blood that unites one family. Mankind did not weave the web of life. We are but one strand within it. Whatever we do to the web, we do to ourselves. All things are bound together.*
>
> Native American Chief Seattle, 1844

Problem

Ever since humans inhabited the earth, we have been changing the environment in which we live through settlement, hunting, gathering, farming, and more recently through a host of activities associated with modern life. In the last 150 years we have seen the combination of rapid population growth and the industrial revolution caused significant environmental changes which affect the well-being of humans in both positive and negative ways. These changes also affect the viability of thousands of species of plants and animals. No part of the planet remains unaffected by human actions.

Survival of the planet depends on whether present and future generations can be educated in ecological literacy—an awareness of the interconnectedness of all life. People are increasingly ecologically illiterate, alienated from natural systems; fewer and fewer have the opportunity for regular experience with nature. Without a broad understanding of the links between human welfare and the environment, environmental protection initiatives must face a host of challenges. With popular support, however, these challenges would not exist or could be more easily overcome. Few ecological institutions have related the challenges of building a sustainable society to the learning process. Such an education requires fundamental changes in many of our present assumptions about schooling; the model of humans *and* nature needs to be replaced by the alternative model of humans *in* nature.

To transform toward ecological sustainability, we must reevaluate many of the assumptions and values which underlie such areas as science, technology, economics, politics, and education. Education, however, has a fundamental role for long-term transformation, for it is primarily through education that changes occur in the other realms. Educational institutions produce the leaders and citizens of the world, influencing greatly whether or not our population consists of ecologically responsible citizens.

The power of education to shape culture can be both positive and negative. Education throughout history has been generating and perpetuating the values and assumptions which have led to our present ecological crisis. In some sense, all education and research is environmental by virtue of what it de-emphasizes or neglects altogether. We have largely excluded environmental concerns from our education, and thus from our cultures. Now we must reintroduce environmental thinking into society by reintegrating it into our education.

Public Perception of Environmental Problems

Public concern about environmental problems is high and rising. In 1990 the Roper Organization, Inc. conducted a survey about public attitudes and individual behavior as it relates to the environment (Roper, 1990). In this and other surveys, over 90 percent of Americans described themselves as environmentalists. Nevertheless, public involvement remains relatively low. There is a clear gap between what American people are saying and doing. This gap stems from the belief that an individual has a very limited impact on environmental problems.

The need to educate the public is best illustrated by the following findings of the Roper poll:

- Nearly half of the people polled believe that they do not have the knowledge to understand environmental problems.
- The most serious environmental problems recognized by over two-thirds of those polled were water pollution from manufacturing plants, oil spills, chemical waste, industrial air pollution, stratospheric ozone depletion, contaminated drinking water, and nuclear waste.
- Global climate change and indoor air pollution were perceived as serious environmental problems by less than half of those polled.
- Most people believe that they can not do much to improve the environmental quality of life. The public feels that the most serious environmental problems are largely beyond their personal control. For 7 out of 10 environmental problems, individuals believe that they can do little or nothing about them.

Environmental Education in Michigan

Disclaimer: ***The intent of this section is to give the reader a general idea of the environmental education endeavors in Michigan and therefore this is only a partial listing of what is happening in Michigan.***

Discussions with the following people were incorporated into this section:

- Cora Boucher, DNR Forestry Management Division, Project Learning Tree
- Kevin Frailey, MUCC, Environmental Education Director, Member, Environmental Education Citizens Advisory Committee
- Linda Humperies, DNR, YES
- Dr. Gregory Keoleian, University of Michigan, Manager, National Pollution Prevention Center
- Joe Leach, president Michigan Alliance for Environmental and Outdoor Education and Hartly Outdoor Education Center

- Dr. Robert Long, Science Education Center, Grand Rapids Community College, Coordinator of Project WILD Michigan
- Norris McDowell, Communications Director, Consortium for International Earth Science Information Network (CIESIN)
- Barbara Nicholas, DNR, Wetland Education
- Dr. R. Ben Peyton, Professor, Fisheries and Wildlife Department, MSU, Chairperson, Environmental Education Citizens Advisory Committee
- Ray Rustem, DNR Wildlife Division, Youth Programs Specialist, Member, Environmental Education Citizens Advisory Committee

"Environmental education" can mean many things. In some educator's eyes environmental education is science education, i.e., chemistry, biology, ornithology. For others, it is expeditions, backpacking, rafting, rock climbing, etc. For a few, and a very few, environmental education addresses true ecological issues. As a result, it is important to understand what one means when they say "environmental education."

K-12 Education

In the public school setting, environmental education (education that focuses on ecology) at the elementary level is usually in the form of a one-day experience at a nature center. Sometimes, current events involving environmental issues are covered, but usually not from a science perspective. At the middle school level, there is often much class schedule flexibility and the greatest opportunity for environmental education, which is most often incorporated in science classes. Generally, the extent of environmental education will be taught only as a result of an individual teacher's interests.

At the high school level, environmental education, if it exists, is usually incorporated into science classes (general science or biology). In a few, but growing number of cases, environmental education is taught through ecology classes—classes dedicated to environmental issues.

There is widespread criticism that science teachers are ill-trained for the task of providing environmental education. In many cases, elementary teachers have a very limited knowledge of basic science concepts. Special programs offered through nature centers and other locations are sporadic and often do not educate in a systematic way. Also, teachers who teach science frequently focus on the same topics, i.e. leaf collecting in the fall, aquatic studies in the spring, and recycling.

Several years ago environmental education commonly meant the teaching of backpacking, canoeing, etc. These courses were often taught through physical education programs and included only experiential types of education. In combination with science classes, they offered an integration opportunity that, for the most part, was never realized.

The first difficulty with environmental education in Michigan is that it is fragmented. There is no state leadership in environmental education and there are many endeavors. The difficulty arises in trying to ascertain exactly what is happening in the state. Often the environmental education efforts of one group are not known to others. There is no easy way to get information about environmental education opportunities statewide, no coordinating agency, no umbrella organization, no central clearinghouse, no phone number to call. Here are substantial materials and programs that small groups, large groups, and individuals have put together, but there is little or no connection between such groups. There are many committed and interested people, but they have a difficult time finding out all the environmental education opportunities in michigan. Also, there is no long-term state commitment to funding.

Some specific environmental educational endeavors

- *Michigan's Youth Environmental Service (YES)*, 1990,
  Michigan DNR, Office of Water Resources
  The Youth Environmental Service was a pilot grant program initiated during the 1990-91 fiscal year. It was developed by the Department of Natural Resources for the purpose of providing and improving environmental education in Michigan. YES was the only state funded grant program which provided elementary through college level students hands-on environmental education. They provided grant money for activities that increase awareness and understanding among Michigan's youth through direct experiences with their environment. Special emphasis was placed on urban and minority youth. In 1990-91, the DNR received more than 500 grant applications which represented more than $3.8 million in requests. Ultimately, over $360,000 was awarded to 55 projects serving nearly 16,000 students. Grants ranged from $180 to $20,000.
  Although YES was considered a tremendous success, the project was not funded by the Michigan legislature for fiscal year 1991-1992.

- *Michigan United Conservation Clubs (MUCC)* has one of the most successful environmental education programs in the state. Their motto is "Conservation through education" and their ultimate mission is to create an environmentally literate citizenry. Their programs are popular, reaching more than 250,000 citizens a year. MUCC's *Tracks* publication reaches as many as a quarter-million children in more than 30 states. The wildlife programs (Wildlife Discovery and Wildlife Encounters) are unique, including participatory ecological lessons. Twice a year adults weekend courses are offered that focus on Michigan's environmental issues and natural resources.

- *Project WILD* is one of the most successful environmental education training for state teachers. Project WILD is a supplementary, interdisciplinary instructional program for teachers of K-12. Project WILD is an environmental and conservation education program of instructional workshops and supplementary curriculum materials for teachers to help them incorporate concepts related to

people, wildlife, and a healthy environment into all major school subjects and skill areas, which prepares students to be responsible decision makers. Project WILD Michigan has been in progress for 19 months, has conducted 55, six-hour workshops, and trained over 1500 educators.

- There are approximately 75 *Nature Centers and Outdoor Education Facilities* in Michigan.

- There are approximately 12 *Traveling Naturalist/Science Outreach Presentation programs* in Michigan.

- There are over 20 *Curricula Units and Supplements* in Michigan. They include Project Learning Tree and Project WILD, and others, as well as educational materials developed by Michigan industries.

In many state departments education is considered a service function. When there are tough economic times, programs that are considered service related, i.e., environmental education are cut. For example, the DNR Information Service Center which housed the majority of publications, maps, films, videos, was recently eliminated. To request information educators and interested citizens now must go to each department that deals with a particular topic, which can mean as many as four or five departments.

Each time the subject of environmental education arises, so does a debate over whether the curriculum should be mandatory. Those in favor of mandatory environmental education cite the success of Wisconsin. Wisconsin mandates both the teaching of environmental education in K-12 and the requirement that all certified teachers take two environmental classes. The difficulty in Michigan stems from the Headley amendment which states that any mandate of the Department of Education must be backed with state funding.

Historically MDNR and Department of Education have not played major role in environmental education. In 1988, the Non-game Wildlife Citizens Advisory Committee, concerned about the lack of an encompassing program, called for a panel to develop joint environmental education programs for the DNR and Department of Education. After discussions with the nongame committee, DNR Director David Hales and state School Superintendent Donald Bemis developed and signed a Memorandum of Understanding. This document identified several elements of cooperation between the two departments including the establishment of an Interagency Task Force (MDE-MDNR), a Citizens Advisory Committee and the development of a state environmental education policy.

A draft of the Environmental Education Citizens' Advisory Committee, (EECAC), states their goal for Environmental Education:

Michigan's environmental education goal is to develop an environmentally responsible citizenry. Environmental responsibility must begin by empowering people, individually and collectively to address environmental issues, whether they live in urban, suburban, or rural communities. Environmental education will enable individuals to understand the connection between themselves, air, land, water, and other living things as well as how these systems relate to the global environment. At the same time environmental education will make it possible for individuals to protect, foster and conserve their environment and use its resources in a wise and prudent fashion.

The EECAC draft report as well as the people interviewed all agreed that Michigan has several critical needs in order to achieve comprehensive implementation of environmental education and environmental literacy in Michigan:

- Coordination of efforts and resources
  a. Educators need access to reliable and timely communication network to encourage comprehensive rather than redundant environmental education programming.
  b. A coordinated approach to providing teacher training opportunities is needed to allow more efficient infusion of environmental education.
  c. An effective means of disseminating and obtaining new and existing curriculum is necessary to facilitate the implementation of the diverse multidisciplinary materials required in environmental education.
  d. Efforts of private organizations and groups need to be coordinated to avoid duplication of effort and to channel limited resources in the state to accomplish the desired environmental education mission.
- Develop and implement comprehensive K-12 environmental education programming
- Provide sources of adequate and stable funding
  a. Some means of funding support is needed for coordination, curriculum development and dissemination, evaluation, and communication.
  b. State agency budgets reflect the need to support and provide leadership for environmental education in the state.
- Institutionalize environmental education as an important mission in Michigan which requires support by state and private organizations
- Monitor and evaluate Michigan's implementation of environmental education

Higher Education

Environmental education and literacy is also sporadic at the university level. Generally there is no attempt to integrate environmental education and risk into general curricula, even for education majors. As previously mentioned, in Wisconsin two environmental courses are required for education graduates. Also, many curricula for those professionals who will have

severe environmental impacts do not teach basic environmental principals. Highlighted below are two Michigan unique attempts to educate at the university and professional levels.

- *The National Pollution Prevention Center (NPPC)* was established by the EPA at the University of Michigan in October 1991 to help students in a wide range of disciplines benefit from an increased understanding of pollution prevention concepts. The Center's mission is to develop materials which incorporate pollution prevention into higher education curricula.

  With contributions from faculty at other universities and the support of government, business, industry, and foundations, the center plans to establish a permanent, nationwide program for higher education curriculum development serving universities in the United States and other countries.

- *Consortium for International Earth Science Information Network (CIESIN,* pronounced "season") is a private, non-profit organization that receives funds directly from the U.S. Environmental Protection Agency, Department of Defense, U.S. Department of Agriculture, and NASA. CIESIN is headquartered on the campus of Saginaw Valley State University. The purpose of the organization is to create a computer network so that data gathered over decades can be disseminated to universities around the world. Also, the system will enable universities to share their own databases with others.

  The primary focus of CIESIN is global change. They are especially interested in obtaining and disseminating information about or could lead to global changes. In addition, they are committed to addressing the human dimension of global change, such as the effect of changes on various populations. Economic information will also be an important part of CIESIN services.

  Currently, CIESIN has several major universities "signed on", including Michigan State University, University of Michigan, Saginaw Valley State University, University of California at Santa Barbara, as well as the Scripps Oceanic Institute and other significant educational institutions.

Environmental Education and Risk Communication to the General Public

By far the greatest influence on awareness and attitude towards the environment is the media. Children also play a role in the education of their parents. As children learn about and understand their environment, this new attitude and knowledge will be conveyed to parents.

For those who are looking for environmental information there are several avenues located in the state:

The most visible statewide leadership in environmental education comes from Michigan United Conservation Clubs (MUCC) and the Michigan Alliance of Environmental and Outdoor Education (MAEOE). MUCC employs four positions whose primary responsibilities lie in the area of environmental education. MAEOE is a volunteer professional organization who has been responsible for a number of major environmental education achievements, including the sponsorship of Project WILD.

- *Prominent Nonprofit Environmental and Conservation Organizations*
  (all have newsletters with circulation to members)
  - Michigan United Conservation Clubs
  - Michigan Alliance for Environmental and Outdoor Education
  - The Nature Conservancy, Michigan Chapter
  - The Sierra Club, Michigan Chapter
  - Michigan Audubon Society
  - Detroit Audubon Society
  - The Michigan Environmental Council
  - West Michigan Environmental Action Council
  - East Michigan Environmental Action Council

- There are approximately 12 substantial Environmental Education Workshops, Conferences and Festivals in Michigan.

Summary

Understanding how we live in a would that is linked economically and ecologically as well as politically is essential to meeting human needs in the 21st century and beyond. Preserving the ability of future generations to meet their needs will require a citizenry with an awareness and ethic for environmental protection. A sustainable future depends on a healthy environment. To protect the environment we must change the mindset of individuals, institutions, communities, and industry with respect to their surroundings.

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Appendix C

APPROVED

,19
MICHIGAN NATURAL RESOURCES COMMISSION

(EXECUTIVE SECRETARY TO THE COMMISSION)

February 19, 1993
RESUBMITTED: March 26, 1993

Memorandum to the Natural Resources Commission:

SUBJECT: Environmental Education Action Plan

Discussion and Background:

In 1989, a Memorandum of Understanding (MOU) was signed between the Departments of Natural Resources and Education concerning environmental education in the state. Included in the MOU was the creation of a Citizens Advisory Committee to provide recommendations to the Departments.

In April 1992, the Advisory Committee provided a series of recommendations. In June, the Commission approved the State of Environmental Education Mission and received the "Report of the Environmental Education Citizens Advisory Committee to the Michigan State Board of Education and the Michigan Natural Resources Commission."

In July, the Director appointed an Environmental Education Coordinating Committee to prepare and implement the recommendations of the Advisory Committee and to ensure that the Department of Natural Resources is efficiently and effectively involved in enhancing environmental education in this state.

The attached document is the draft environmental education plan.

Recommendation:

This memo was submitted for information only at the March 10, 1993, meeting of the Natural Resources Commission. We are now recommending that the Commission adopt the Plan and direct the Department to implement the recommendations contained within, with periodic status reports to the Commission as to success of implementation.

Donna Stine
Economic Development
Liaison

Russell J. Harding
Deputy Director

Michael D. Moore
Deputy Director

I have analyzed and discussed this recommendation with the Deputy Directors, and staff, and concur.

Roland Harmes
Director

Attachment

March 26, 1993

DEPARTMENT OF NATURAL RESOURCES

ENVIRONMENTAL EDUCATION ACTION PLAN

MISSION

The Department is effectively involved in formal and nonformal environmental education to facilitate clean water, clean air, productive land and healthy life.

DEFINITIONS

Environmental Education

For purposes of providing direction, the Environmental Education Coordinating Committee (Committee) defines environmental education as:

- The act of facilitating an understanding by citizens of the connection between themselves, air, land, water and other living things, as well as how these systems relate to the global environment, thus making it possible for them to make informed decisions regarding protection and conservation of their environment and utilization of its resources in a wise and prudent fashion.

NOTE: It is not the intent of the Committee to include in this definition the sharing of information regarding specific programs, laws, or administrative actions.

Formal Environmental Education

- The K-12 educational system.

Nonformal Environmental Education

- Those environmental education activities outside of the K-12 system.

FORMAL ENVIRONMENTAL EDUCATION GOAL

THE DEPARTMENT ENCOURAGES, SUPPORTS, AND FACILITATES FORMAL ENVIRONMENTAL EDUCATION.

STEP ONE: CREATE AN ORGANIZATIONAL STRUCTURE TO ENSURE FULFILLMENT OF GOAL.

Action: Appoint an Environmental Education Coordinator.

Action: Make permanent Environmental Education Coordinating Committee.

Action: Establish a State Environmental Education Advisory Board.

Environmental Education Coordinating Committee (Committee) Recommendations:

1. The Committee strongly supports the creation of an environmental education coordinator position within the Department. A position description is attached which defines the responsibilities of the environmental education coordinator.

   While there is currently not an environmental education coordinator, many of the Divisions have a staff person who has some environmental education responsibilities. An environmental education coordinator would provide a focal point for these individuals and their activities would make the efforts more effective and better utilize scarce resources.

2. The Committee recognizes the Department's fiscal and hiring constraints and, therefore, recommend that the Committee continue to function in its current coordination capacity. The Committee also recommends that all Divisions be included in the Committee. Thirdly, the Committee recommends that the Chair of the Committee rotate yearly among the members of the Committee.

3. In order to promote environmental education in this state, it is imperative that all of those involved in environmental education meet together on a regular basis. The Committee has discovered that much is happening around the state regarding environmental education but, unfortunately, some of the work is being duplicated. The Committee recommends that a state environmental education advisory board be created by the Director to provide this critical coordination function.

4. The Committee also recommends the creation of an environmental education foundation to assist in coordination of environmental education activities, help develop curriculum materials, provide teacher training and assist in implementation of the Citizens Committee recommendations.

STEP TWO: ENVIRONMENTAL EDUCATION IS INTEGRATED INTO CURRICULUM OBJECTIVES.

Action: Assign a DNR employee to work with the Department of Education on revision of any new objectives.

Environmental Education Coordinating Committee Recommendation:

Committee member should be assigned the responsibility of working with the Department of Education on revisions of curriculum objectives until such time as an environmental education coordinator is appointed.

STEP THREE: INTEGRATE ENVIRONMENTAL EDUCATION INTO ASSESSMENT MECHANISMS.

Action: Assign a DNR employee to work with the Department of Education to ensure that environmental education is contained in assessment questions.

Environmental Education Coordinating Committee Recommendations:

The Department should continue to participate with the Department of Education on the science objectives assessment mechanism. In addition, the environmental education coordinator or a member of the coordinating committee would be assigned responsibility for assisting in the preparation of other assessment mechanisms.

STEP FOUR: DEVELOP AND PUBLISH A SCOPE AND SEQUENCE MODEL FOR ENVIRONMENTAL EDUCATION. A SCOPE AND SEQUENCE MODEL IDENTIFIES EXPECTED OUTCOMES FOR STUDENTS AT THE ELEMENTARY, MIDDLE, AND HIGH SCHOOL LEVELS.

Action: Work with appropriate partners to develop a grant to prepare a scope and sequence model.

Action: Develop the scope and sequence model.

Action: Have appropriate review of scope and sequence model.

Action: Utilize the model in curriculum review and compilation, and presentations, to facilitate an understanding of how to incorporate environmental education into current curriculum.

Environmental Education Coordinating Committee Recommendations:

The Committee recommends that the Department work with neighboring states to secure a U.S. Environmental Protection Agency (U.S. EPA) Environmental Education Grant to develop a scope and sequence model. The Committee has begun initial discussions on this recommendation with neighboring states.

STEP FIVE: PROMOTE AND ENSURE EFFECTIVE AND COMPREHENSIVE ENVIRONMENTAL EDUCATION CURRICULUM TO FACILITATE MEETING THE ENVIRONMENTAL EDUCATION OBJECTIVES AND THE OUTCOMES AS IDENTIFIED IN THE SCOPE AND SEQUENCE MODEL.

Action: Compile available environmental education curriculum and materials.

Action: Identify how curriculum matches objectives.

Action: Develop recommendations for a clearinghouse to make curriculum easily accessible to teachers and other educators.

Action: Identify gaps in curriculum and assist in the development of needed curriculum.

Environmental Education Coordinating Committee Recommendations:

1. The Committee applied for and received, through the Forest Management Division, a $10,000 grant to utilize a student assistant to compile available environmental education curriculum, especially targeted to Michigan and how the curriculum matches the objectives.

2. There are several clearinghouses for environmental education materials. The U.S. EPA gave a major grant to the University of Michigan to establish a clearinghouse, the National Park Service maintains an extensive clearinghouse, as does Ohio State University. The Committee feels that, by utilizing existing clearinghouse structures, the state can achieve the recommendation of the Citizens Committee.

3. The Department should work in partnerships with others interested in environmental education to obtain a grant to input Michigan curriculum into the appropriate clearinghouse.

4. Once the curriculum has been compiled and the scope and sequence model completed, the Committee will assist in the identification of missing curriculum pieces. It is the recommendation of the Committee that the development of curriculum within this agency be avoided until such time as there is a solid understanding of what is needed. Draft for curriculum development guidelines are attached which outlines the process to ensure an adequate distribution system that it is targeted to the appropriate audience, and that the curriculum matches the science and other relevant objectives.

STEP 6: FOSTER TEACHER TRAINING SESSIONS TO ASSIST TEACHERS IN BECOMING FAMILIAR WITH ENVIRONMENTAL EDUCATION, THE AVAILABLE CURRICULUM, HOW TO ACCESS CURRICULUM, AND HOW THE CURRICULUM MEETS APPLICABLE CURRICULUM OBJECTIVES.

Action: The Department, working with the state environmental education advisory council, determine the most effective means to develop and conduct teacher training sessions.

Action: The Department will work with private and public organizations to implement training sessions.

Action: Training sessions will be conducted and updated as necessary.

Environmental Education Coordinating Committee Recommendation:

Teacher training is an essential element in integrating environmental education into Michigan's classrooms. Therefore, the Department must be a partner in teacher training dependent on whether a coordinator position is created.

NONFORMAL ENVIRONMENTAL EDUCATION GOAL

THE DEPARTMENT SHALL EFFECTIVELY UTILIZE NONFORMAL ENVIRONMENTAL EDUCATION TO ASSIST MICHIGAN'S CITIZENS IN UNDERSTANDING AND SUPPORTING THE DEPARTMENT'S MISSION AND ASSISTING IN ACHIEVING THAT MISSION

STEP 1: ENSURE THAT THE PUBLIC IS AWARE OF EMERGING NATURAL RESOURCES AND ENVIRONMENTAL ISSUES.

Action: Develop a process for the Department to produce briefing papers on emerging resource and environmental issues.

Action: Identify methods (for example the former Natural Resources Register) for making information accessible to citizens and educators.

Action: Identify funding needs and potential funding sources.

Environmental Education Coordinating Committee Recommendations:

The Committee believes that while there are many curriculum packages available to assist in formal environmental education, there is not comparable sources of information for the public to understand emerging natural resource and environmental issues (i.e., toxic deposition in the Great Lakes). The Committee recommends that the Department pursue the development of briefing papers which explains the information the public could access through computer.

STEP 2: ENSURE THAT THE DEPARTMENT'S NONFORMAL ENVIRONMENTAL EDUCATION EFFORTS ARE COORDINATED.

Action: Survey Divisions for ongoing environmental education activities.

Action: Develop a cadre of employees who are interested in being a spokesperson for the Department with the educational community.

Action: Conduct a training session for Department employees to ensure that they are effective communicators on natural resources and environmental issues.

Action: Coordinate a review of all applications made by the agency for environmental education grants, establish grant priorities, and recommend those that should be submitted.

Action: Ensure that grants administered by the Department for environmental education are coordinated with the Department's environmental education effort.

Action: Coordinate, compile and implement an environmental education campaign regarding a DNR priority (e.g., impact and control of airborne toxins) utilizing all of the educational vehicles within the Department.

Action: Coordinate the editorial and content recommendation for each issue of the Michigan Natural Resources Magazine to assist the Department in meeting its mission.

Action: Continue to coordinate the Higgins Lake Environmental School to assist in teacher and the public's training on environmental/natural resources issues.

Environmental Education Coordinating Committee Recommendation:

The Committee feels that the action steps will lead to a coordinated effective environmental education program within the Department. The Committee recognizes that the list is only the first step in re-establishing an effective and efficient environmental education program. It represents, however, attainable opportunities for success upon which to build further actions. The Committee will continue to look for additional opportunities as we implement the recommendations contained with this action plan.

Attachment

Appendix D

Report of the

Environmental Education Citizens' Advisory Committee

to the

Michigan State Board of Education

and the

Michigan Natural Resources Commission

2-25-92

The question is, does the educated citizen know he is only a cog in an ecological mechanism? That if he will work with that mechanism his mental wealth and his material wealth can expand indefinitely? But that if he refuses to work with it, it will ultimately grind him to dust? If education does not teach us these things, then what is education for? (A. Leopold 1949, A Sand County Almanac. p.210)[1]

[1]Leopold, Aldo. 1949. A Sand County Almanac. (7th printing) Ballantine Books, Inc. New York. 295 pp.

Introduction

Interest in environmental education (EE) has witnessed a resurgence during the last few years. In addition to several national initiatives by both private and federal organizations, citizen associations have shown increased interest.

During 1988, the Michigan Nongame Wildlife Trust Fund Citizens Advisory Committee contacted the Department of Natural Resources Director, David Hales and Superintendent of Public Instruction, Donald Bemis and requested a meeting to explore opportunities for EE in Michigan.

After discussions with the nongame committee, DNR Director David Hales and State School Superintendent Donald Bemis developed and signed a Memorandum of Understanding. This document identified several elements of cooperation between the two departments. These included the establishment of an Interagency Task Force between the Michigan Department of Education (MDE) and the Michigan Department of Natural Resources (DNR), a Citizens Advisory Committee and the development of a state EE policy.

During the following year the Interagency Task Force developed a draft environmental education policy for review by interested parties. An informal conference was held in East Lansing, Michigan in June 1990. Over seventy people representing various interests in EE discussed the state's needs and reviewed the draft policy. Nominations for the citizens advisory committee were taken from this meeting as well as interested parties who could not attend.

The Environmental Education Citizens Advisory Committee (EECAC) (Appendix B) appointed by Bemis and Hales, held its first meeting in January 1991. The committee was charged with the following items:

Task 1. Develop a statement of philosophy on environmental education, to be adopted by the Natural Resources Commission and the State Board of Education.

Task 2. Identify the necessary and critical components of a practical, effective, and coordinated approach by state government to the instruction of students in the history, current status, and future trends of environmental protection and resource management in Michigan.

Task 3. Identify methods by which environmental education can be fully integrated into the curricula of public schools in Michigan, also identifying the difficulties and impediments to this full integration.

Task 4. Develop recommendations for steps that each Department can take to overcome these impediments and resolve the difficulties identified in step 3.

The committee split the tasks and worked through smaller subcommittees to allow involvement and input by other individuals and organizations. Four subcommittees were established and assigned specific tasks. This work took place over the spring and summer of 1991 and final reports from the committees were submitted in September.

Subsequently, the EECAC has assembled all the information into this report presented to the Natural Resources Commission and the State Board of Education.

The ideas and recommendations presented in this report reflect the best thinking of professional individuals and organizations involved and concerned with EE. The findings of EECAC are also based on experiences of other states and provinces and on information gathered from studies and reports published in professional journals.

RESPONSE TO TASK 1

The following statement of philosophy was developed originally by DNR staff and circulated widely among environmental education professionals. Input was provided at the informal June, 1990 conference. The EECAC also distributed the draft to key environmental organizations before revising the document to its current form.

Statement of Environmental Education Mission

The goal of EE in Michigan must take into account the impacts humans have on the resources existing on this planet. Future generations will judge us on the quality and commitment we had to insuring the continued existence of these resources.

Environmental Education Goal:

> Michigan's EE goal is to develop an environmentally responsible citizenry. Environmental responsibility must begin by empowering people, individually and collectively to address environmental issues, whether they live in urban, suburban, or rural communities. Environmental education will enable individuals to understand the connection between themselves, air, land, water and other living things as well as how these systems relate to the global environment. At the same time EE will make it possible for individuals to protect, conserve and foster their environment and use its resources in a wise and prudent fashion.

Rationale:

Consisting of two peninsulas and surrounded by the largest freshwater system in the world, Michigan reflects the dramatic geologic and natural forces that have shaped its face. This unique system of land and water has produced an abundant and diverse resource base fostering major developments in industry, agriculture, and recreation. The protection of these resources is essential to maintaining an economically diverse and stable economy for Michigan's citizens.

The Great Lakes are not immune from human activities outside the watershed that degrade the environment. Air toxics may enter the atmosphere from outside the basin and deposit in our "sweetwater seas," impacting the quality of our fisheries resources. By the same token, our own activities in Michigan may contribute to environmental degradation of the St. Lawrence Seaway system, which in turn may impact the saltwater oceans. It must be recognized that our State's resources are not segregated, but exist as part of a global continuum.

Each citizen is entitled to clean air, clean water, productive land, and a healthy environment. EE offers the best hope to instill in the citizenry a respect and responsibility to maintain and enhance the resource base that has sustained us, and to pass on the same stewardship responsibilities and opportunities for enjoyment to future generations of Michiganians.

Interpretation:

The goal of EE in Michigan is to develop and enhance citizens' environmental literacy. An environmentally literate person:

- Has an awareness and concern about the total environment;
- Possesses the knowledge necessary to understand both the environment as a system and the role humans play as a component of the system;

- Perceives how the development of human technology has the ability to degrade and/or protect the environment;

- Applies their awareness and knowledge in assessing environmental consequences of their actions, individually and collectively, before and after actions are taken, and resolves problems caused by either their own action or actions of others;

Objectives:

Awareness--help individuals acquire an awareness of and sensitivity to the natural environment and its component parts.

Knowledge--help individuals understand and have the ability to access a variety of information on topics related to the environment, including:

- ecological and physical sciences;

- current and future environmental issues;

- socio-economic and environmental consequences of individual and social decisions

Values--provide opportunities for developing individual and public values affecting resource management:

- recognition and acceptance that a range of values are held for environmental attributes;

- establishment of individual value priorities;

- opportunities for self clarification of individual environmental values.

Attitudes--provide opportunities for developing responsibility in making environmental choices grounded on a factual knowledge base and well identified value system.

Skills--help individuals develop the ability to participate in resolving or implementing solutions to environmental problems:

- ability to observe and properly interpret their environment;

- ability to gather current environmental information through available media (TV, radio, newspaper, periodicals, etc.);

- ability to discern the usefulness (accuracy, credibility, and bias) of environmental information;

- ability to research information needed to formulate and support values positions;

- ability to participate effectively in public input processes including letter writing, discussion and speaking.

Behavior--develop in individuals a commitment to become actively involved in working toward resolution and prevention of environmental problems individually and collectively, through awareness or process, opportunities, and benefits to be gained. Participation behaviors include any of the following:

- legal
- political
- persuasive
- consumerism (wise consumption of products)
- economic (contributions)
- eco-management (physical activities to enhance environmental quality)

Implementation:

Although EE has a strong science component, to be effective, implementation depends on multi-disciplinary instruction. Aspects of EE should be included in all educational subjects from human health to social science to ecology and at all levels, K-12.

Additional fronts on which these objectives will be applied include informal youth education through existing programs such as scouting groups, 4-H, and other youth organizations. Achievement of the environmental objectives also requires education of the adult population, including those who make decisions with immediate impacts on the future of state resources.

Evaluation:

In any subject, literacy requires achievement at various stages of cognitive development. Evaluation requires direct measurement of the level of competence at each stage. Environmental literacy has a similar process. Direct measurement can be used to evaluate objectives in awareness, knowledge, and skills instruction.

The primary difference with environmental literacy as described is the inclusion of attitude and value components as well as action objectives in the behavior component. These components require longer term development and are not easily evaluated in current formal testing. Attitude and value components may require development of innovative evaluation procedures of processing abilities outside of the formal education setting.

Action objectives in the behavior component will be the most challenging to assess, requiring long-term development and evaluation to determine both use and commitment to behaviors.

Nonformal education likewise will pose unique challenges to develop methods to evaluate achievement of environmental literacy goals. Cooperation with research universities will provide a source of methods for measuring achievement success.

RESPONDING TO TASK 2

To identify components of a coordinated approach to EE by state government, the EECAC reviewed the structure of programs in other states noted for their commitment to EE.

A Review of EE in Other States

Local control is a basic philosophy of education in Michigan. EE in the state reflects this perspective and exists primarily as a grassroots effort. In contrast, many states have initiatives at the state level which serve to provide EE leadership and support. Some of these such as Colorado's clearinghouse for EE materials (DEER) and Florida's EE Advisory Commission are documented in Appendix C. Wisconsin is exemplary in the degree of strong state leadership in EE. The status of EE in Wisconsin is described here as a model which illustrates some institutional aspects which may be desirable for Michigan. Certainly Wisconsin's EE program suggests what is possible with strong support and cooperation among policy makers, educators and citizens.

Wisconsin...

> ...has legislation which mandates that each K-12 district file an EE plan (including a scope and sequence) with the state to receive available state funding.
>
> ...has legislation which mandates EE training for elementary education and secondary science, social science and agriculture majors leading to teacher certification in the state.
>
> ...has legislation which established a grant program to encourage and support development of EE programs and research in districts throughout the state. (A bill is currently under consideration to increase the funds available from $200,000 to $500,000 by placing a surcharge on all polluter fines.)
>
> ...has legislation which established a state EE advisory board that serves to provide direction and policy for EE implementation in the state. The board takes a strong leadership and supportive role in EE. Among other tasks, the board yearly reviews and selects current and developing environmental topics and issues which educational programs should target; administers the EE grant process and initiates policy to improve and enhance EE in the state. The board has a half time position which serves as a program assistant.
>
> ...has legislation which has created and appropriated funds for a Center of Environmental Education which employs a director, elementary education specialist, secondary education specialist, three graduate assistants and one program assistant. In addition, there are 25 ad hoc faculty which have been trained throughout the state to offer inservice education programs in EE. The Center was created with an addition to the base funding of the U-W budget. The Center provides a continuing structure for inservice teacher training, reviews, evaluates and disseminates EE curriculum materials, and plays a key role in facilitating the continued development of EE in Wisconsin.
>
> ...employs several positions in the Departments of Natural Resources (WDNR) and Public Instruction (WDPI) to coordinate and nurture EE in Wisconsin. The WDPI has a full time Environmental Education Program Specialist. The WDNR employs 3 FTE's in the central office which are environmental educators. Three of the six district offices have a full time EE position. Full time positions also exist in the Wildlife Division, the Fisheries Division and in Solid Waste Management. In addition, each Division has at least one position which has some portion of responsibility designated for EE.

...EE professional coordinators in the state agencies support, coordinate and nurture an active EE inservice training program for the state's teachers.

...All of this activity is synergistic and creates opportunities for expanding and nurturing EE in Wisconsin; e.g., institutional systems are in place to provide for effective dissemination of curricular materials or teacher training programs that become available; the communication network among public educators reinforces a multiplier effect for EE. "It seems that once we reached a sort of critical mass in Wisconsin environmental education, the whole process got easier. We have so much support and enthusiasm for EE now, that it is significantly easier to get things done...There are a remarkable number of coalitions and cooperative projects being formed all of the time in EE. " (R. Champeau, Director of the Wisconsin Center for Environmental Education, pers. comm.)

Based on the review of EE components of other states, the following components appear to be critical for Michigan in achieving effective leadership in EE.

...Articulated vision of EE, both formal and nonformal.

...Legislation which establishes EE priorities and allocates necessary resources for achievement of identified EE goals.

...Designated staff in both DNR and MDE.

...Coordination among state agencies and private organizations.

...Documents or models to provide direction for curriculum development and implementation.

...Accessible EE library or resource center to link districts to successful curriculums, programs, professional development and evaluation.

...Incentive programs targeted at state goals. (E.g., K-12 articulated EE programs)

...Statewide professional development opportunities.

RESPONSE TO TASK 3

To identify how EE could be integrated into curricula, the Committee examined first the ongoing EE activities and programs in the state. This included a review of state level resources, curriculum materials, professional development opportunities, resources provided by private organizations, policy support for EE by educational organizations, existing legislation, and a variety of local and regional EE programs. EECAC also held informal discussions with a variety of educators and citizens concerned with EE.

EE in Michigan

In comparison to EE in Wisconsin, EE in Michigan is fragmented. It exists with little support of assigned staff or financial resources at the state level.

The professionals within the Michigan Department of Natural Resources (DNR) have expressed a long term interest in EE. Many efforts have been initiated to develop EE programs or assign staff to deal with educational needs relative to resource management. Unfortunately, these efforts have not been supported as comprehensive, agency wide programs. Many of these efforts fail to be fully effective because they are short term and poorly coordinated within the agency.

Currently, the DNR has one full time Environmental Education Specialist in the Department and another specialist working in the Wildlife Division. Several employees in other divisions occasionally have part time assignments relating to EE. The Division of Forestry has an employee who serves as state co-coordinator of Project Learning Tree as one of many assigned tasks. The DNR cooperates with 5 universities in Michigan who sponsor the summer Environmental School at Higgins Lake for interested educators, DNR employees and other citizens. Other isolated--but important--examples of EE activity exist particularly through the Nongame Heritage Trust Fund. However, many DNR EE activities are uncoordinated, lack continuity, and are often unknown by classroom educators statewide.

The Michigan Department of Education has assigned EE as an additional, but secondary responsibility of the Science Education Specialist and the Coordinator for Mathematics and Science Education. These positions do not have designated resources to provide leadership or coordination of EE activities statewide. No written documents are available from the Department to provide guidance or technical assistance to schools requesting information or help in curriculum development. Time spent on EE is devoted to representing the MDE on state level environmentally related committees and referring EE inquiries to other agencies and organizations.

The most visible statewide leadership in EE comes from Michigan United Conservation Clubs (MUCC) and the Michigan Alliance of Environmental and Outdoor Education (MAEOE). MUCC employs four positions whose primary responsibilities lie in the area of EE. MUCC serves an essential role in EE in the state, but a private organization with goals other than formal EE, cannot allocate a large proportion of its funds for that effort. In spite of the fact that MAEOE is a volunteer professional organization with limited fund raising abilities and a relatively small membership, the organization has been responsible for a number of major EE accomplishments in the past. One of these has been a two year sponsorship of the national Project WILD program which will impact hundreds of teachers and thousands of students in Michigan.

Other organizations also make important contributions to formal K-12 EE (Appendix D). These efforts are primarily regional such as SEE-NORTH, an EE center at the University of Michigan Biological Station at Pellston. A recent grant from the Kellogg Foundation to Michigan State University and other educational institutions for the purpose of improving groundwater education is an important statewide effort. The project (Groundwater Education in Michigan; GEM) focuses only on groundwater issues. Although it is designed

to foster ongoing groundwater education programs in various institutions in the state, its statewide status is temporary and dependent on the duration of the grant program.

All of this illustrates a commendable amount of EE activity in the state which should not be underestimated. However, coordination and centralized leadership is not provided in the state and this condition often creates inefficiency and ineffectiveness in EE. The need for more EE expertise and coordination in the two state agencies is illustrated by a project in the DNR to produce educational materials concerning solid waste management for use in Michigan classrooms. Clean Michigan Funds (over $350,000) were used to develop and distribute an educational program known as Waste Information Series for Education (WISE). The completed multi-media program is an impressive educational curriculum which includes video, filmstrip, student activities, teacher manuals, and student materials (e.g., newspapers) all dealing with the solid waste problem and issues facing Michigan. Supervision of the project was assigned to a DNR staff member in addition to other duties related to natural resource management. Without a full time staff assignment to supervise the process, the project took longer than expected to complete. A copy of the educational kit was sent to each school in the state. Plans for teacher training on the WISE materials were abandoned when budget cuts in the agency eliminated the WISE supervisory assignment. Without this training and leadership, the program was left with an ineffective means of assuring use of educational materials by classroom teachers.

Today, few teachers know of the existence of this set of materials in their schools. No position officially has responsibility for managing the WISE materials. The newspaper materials are out of print and unavailable to teachers who do wish to use the WISE program. The teacher training component of the original plan has never been implemented. Revision of student materials would not be possible even if demands for the program existed. A substantial amount of money has been invested in the development of a potentially excellent program regarding a critical environmental issue in Michigan. Yet, the product is having little impact on a statewide basis. The failure of WISE to achieve its full potential is not due to incompetence of those assigned to develop and supervise the project. Nor was the DNR incorrect in attempting to infuse its technical knowledge regarding this critical waste management problem into the public education system. This situation exists at least in part because of a lack of EE structure in the state including ongoing teacher training and curriculum dissemination networks for EE. In part, it is due to a lack of adequate EE expertise and support in the DNR. Professional environmental educators know full well that development of EE curricula is only a small part of educational programming, and without other critical components, these curriculum efforts are largely wasted. As the WISE example illustrates, EE curriculum projects in Michigan are forced to design and support their own dissemination system, resulting in fragmented and competing efforts to attract and train teachers.

Project WILD offers yet another example of an excellent program which was nearly lost to Michigan because of a lack of state leadership in EE. Project WILD is a K-12 supplementary EE curriculum which provides educational activities focused on wildlife ecology and management. In 48 other states, Project WILD was proving to be an excellent teaching tool, but more importantly it was a program which led to cooperative efforts and communication among resource management agencies, state education departments and public school teachers and students. Designed primarily for use by a state resource management agency, the program was rejected by the DNR, at least in part because the agency does not have a traditional strength in education and is not familiar with the use and benefits of a program such as this. The Michigan Alliance of Environmental and Outdoor Education took the initiative to bring the program into the state. However, this volunteer organization does not have the capability to maintain Project WILD once the initial grant funds have been depleted in two years. Without support from a state agency, it is not likely that Project WILD will continue to be a viable program in Michigan as it is in many other states. Regardless of whether Project WILD continues to flourish, unless the DNR serves in a leadership role, the agency will not reap the promotional and educational benefits of the program being enjoyed by resource agencies in other states.

A final example illustrates the consequences of a lack of EE advocacy in the MDE. Recently, the Core Curriculum Model was developed by the MDE as part of the PA 25. While environmental concerns were not lacking from the model draft, EE was not visible as a well infused and legitimate component of the model. The Environmental Education Citizen's Advisory Committee examined a draft of the document and identified many opportunities to strengthen the EE component of the model. With the exception of one, these recommendations were accepted and revisions made accordingly. The enhancement of EE in the Core Curriculum resulted from a temporary committee functioning at the time the Core Curriculum model was being developed. In a time of shrinking resources, a committee such as this may need to exist on a permanent basis to provide this kind of expertise. Without EE leadership and advocacy within the MDE, EE will continue to be an after thought not only to the agency, but to most of the school districts who look to the MDE for guidance.

Informal discussion with a variety of educators revealed that EE is taught in many schools. However, few districts have established objectives or desired outcomes for students in EE. Limited availability of resources and curriculum materials restrict EE topics which are covered in the classroom. This reliance on easily obtained materials results in EE programs not being well articulated, current and coordinated.

Needs to Enhance Environmental Education in Michigan

The situation described above suggests several critical needs to achieve comprehensive implementation of EE in Michigan.

Need 1: Coordination of efforts and resources

A. Educators need access to a reliable and timely communication network to encourage comprehensive rather than redundant EE programming.

B. A coordinated approach to providing teacher training opportunities is needed to allow more efficient infusion of EE.

C. An effective means of disseminating and obtaining new and existing curriculum is necessary to facilitate the implementation of the diverse multidisciplinary materials required in EE.

D. Appropriate policies and initiatives within DNR and MDE need to be reviewed and coordinated to ensure that they are reflective of the EE mission.

E. Efforts of private organizations and groups need to be coordinated to avoid duplication of effort and to channel limited resources in the state to accomplish the desired EE mission.

Need 2: Develop and implement comprehensive K-12 EE programming

Need 3: Provide sources of adequate and stable funding

A. Some means of funding support is needed for coordination, curriculum development and dissemination, evaluation, and communication.

B. State agency budgets should reflect the need to support and provide leadership for EE in the state.

Need 4: Institutionalize EE as an important mission in Michigan which requires support by state and private organizations

Need 5: Monitor and evaluate Michigan's implementation of EE

Responding to Impediments and Opportunities for EE in Michigan

Although there is a window of opportunity that promises hope for the inclusion of environmentally relevant goals in the curricula of public schools, acknowledgement must be given to some of the impediments that could inhibit integration. Three of the major impediments are attitudes, money, and time.

Thus far, the American public has not had sufficient concern for the environment to significantly support educational efforts to influence our environmental attitudes and behaviors. This lack of concern perpetuates more of the same attitude–a self defeating cycle. The cycle must be broken by EE beginning in the elementary grades and continuing through high school and beyond. Our environmental concerns need to extend further than to issues that personally affect an individual.

It is not surprising then, that as the economy goes, there goes the environment. When money gets tight on the state and national levels, both the concerns for the environment and support for education suffer. Financial stability for EE is essential if a coordinated program for EE is to impact our society. Lack of stability impedes statewide leadership needed to coordinate EE activities for bringing about a successful implementation.

A third major impediment is time to teach environmental activities in a curriculum that is already overburdened with content and activities dominated by the basics of education. Consequently, alternative strategies for infusion into the total curriculum are needed. This method of teaching will require time to develop successful models and then to train teachers to enable implementation. Time is also needed to develop an articulated K-12 curriculum.

Many opportunities currently exist for nurturing EE in Michigan and some of these are illustrated here.

1. PA 25 provides an excellent vehicle to enhance EE in Michigan schools in a manner consistent with the local control policy of the state. The Core Curriculum Model identifies EE as a consistent component of the educational outcomes which supports an effective infusion model advocated by EE professionals. The requirement that schools hold local public meetings to discuss community concerns and preferences for educational programming could potentially lead to greater emphasis on EE in a given district. This could occur statewide if leadership existed to facilitate that process and make parents, citizens and educators aware of the opportunity and need for EE in their own community. For example, the state could provide leadership in developing an assessment process for local citizens and educators to use in determining the extent to which EE goals are being achieved in their local program. State leadership could also facilitate efforts by these local groups to strengthen school EE programs if deficiencies are identified in the assessment.

2. The essential objectives which have been developed for other traditional educational disciplines (e.g., mathematics, science, social studies) do include some objectives which are pertinent to EE. EE professionals at the state level could strengthen the presence of EE in other disciplines and make an equally positive contribution to those disciplines as well. Infusing EE into other disciplines often adds interest and opportunities for meaningful educational experiences for students without detracting from the traditional disciplinary goals. A means of systematically reviewing any disciplinary objectives being revised is necessary to insure effective infusion of EE.

The Committee developed a preliminary model (Appendix E) to illustrate the type of student outcomes needed to guide EE planning in the state. Although, the Committee feels the model has merit, the list of outcomes presented here is not a completed document.

3. Following the essential objectives format used by other disciplines, a similar document could be developed for EE. The objectives for EE may not be accompanied by a state testing program as is currently mandated for other disciplines. (This could, however, be a future development if desired.) A model scope and sequence would be of use in providing direction to public schools seeking to incorporate EE in their programs or to evaluate the status of existing EE efforts.

4. Michigan requires continued inservice training of professional teachers. Opportunities could be developed to increase exposure to EE methods and content while fulfilling other training needs of educators.

5. The EECAC could find only two pieces of legislation which dealt with forms of environmental education. One of these is PA 147 (1987) which permits school districts to use land they own or lease to develop outdoor education sites. No resources are allocated to assist in the development of these sites. The second is PA 267 (1986) which includes environmental education as one of the certifiable areas for which teachers must pass a competency test in order to have that discipline listed on their Michigan teaching certificate. The lack of more supportive legislation is an impediment to EE in Michigan.

RECOMMENDATIONS

The critical needs for EE in Michigan identified earlier include need for coordination of EE programs in the state, development and implementation of statewide EE programs, sources of adequate and stable funding, institutionalize EE, and to monitor and evaluate EE in Michigan. An effective response to these needs would be to provide leadership at the state level which can perform functions of statewide coordination and support not available in local or regional private institutions. The two state departments best positioned to achieve this are the MDE and DNR.

Recommendation 1:

The Department of Education will be the coordinating agency within the state to insure EE is incorporated as a comprehensive and programmatic theme in Michigan public schools.

Rationale:

The Michigan Department of Education has the mission of assisting schools in development and implementation of educational programs throughout the state. As such it is this Department that should have primary responsibility for setting policy for EE, facilitating the adoption of EE programs, guiding teacher training opportunities and coordinating and disseminating EE materials within the K-12 school structure.

Strategy:

This recommendation can be implemented either through creation of an Office of Environmental Education or a specialist position assigned full time to EE.

This OEE/position would:

...coordinate state EE efforts within the K-12 education system.

...develop a long term plan for implementation of EE in Michigan.

...develop a strategy for long term stable funding of EE.

...act as the Departmental staff representative to the State Environmental Education Advisory Committee.

...find means to encourage local school districts to adopt and implement effective EE programs in their curricula.

...monitor the need for teacher training (pre- and inservice training) in EE and facilitate effective training opportunities throughout the state.

Recommendation 2:

Establish an EE specialist position within the Department of Natural Resources.

Rationale:

The Department of Natural Resources has the technical expertise regarding effects of environmental damage and resource management. The DNR can provide support on critical issues and the knowledge needed to make reasonable decisions. The agency is also in a position to identify specific needs for EE among Michigan residents. In addition, the agency can serve nonformal EE by providing technical expertise and to some extent leadership in these programs. To fulfill the DNR's diverse and supportive role in EE, the Environmental Education Citizens Advisory Committee makes the following recommendations.

This position would be responsible for the following:

...serve the DNR's need for its own educational program by coordinating all DNR activities pertaining to EE.

...review development of DNR projects and materials and recommend revisions, development and dissemination processes.

...serve as liaison with the Department, of Education Office of Environmental Education/Environmental Education Specialist.

Recommendation 3:

The DNR should aggressively evaluate programs such as Project WILD and Project Learning Tree and, when appropriate, provide resources to adopt the programs and provide leadership in their implementation.

Rationale:

Without this type of leadership, opportunities to make useful EE materials available to Michigan teachers and students are often lost. Further, involvement in this process would provide benefits to the DNR by increasing citizen literacy in EE and otherwise allowing the agency to achieve its management goals.

Recommendation 4:

Establish an DNR committee with representation from all divisions to review and recommend action on DNR EE activities.

Rationale:

Without coordination, efforts are often duplicated and/or not well recognized and utilized statewide.

Recommendation 5:

Provide training opportunities for development of DNR personnel to enhance their abilities to work with and support formal and nonformal environmental educators in the state.

Rationale:

Opportunities to effectively work with educators in the state are often not optimized because personnel lack educational background to appropriately identify and respond to educators' needs.

Recommendation 6:

A centralized Environmental Education Information System should be established and maintained by the MDE and DNR in collaboration with other state agencies (e.g. Departments of Agriculture and Public Health).

Rationale:

A communication network to keep educators apprised of EE materials and programs does not currently exist as it does for other traditional disciplines. A centralized system could assist in the dissemination of current materials and make these easily available to educators in the state.

Strategy options:

...create in the State Library System or other appropriate institution, a special section and process for collecting, storing and retrieving EE materials

...create a computerized resource system which is accessible to Michigan educators for identifying environmental education resources.

...find means to strengthen and support the EE component of services provided by Intermediate School Districts and Regional Educational Materials Centers and regional Mathematics and Science Centers.

Recommendation 7:

Establish a State Environmental Education Advisory Board.

Rationale:

An Advisory Board would be instrumental in monitoring needs and creating opportunities for EE in Michigan.

Strategy:

A board should be comprised of decision and policy makers representing both private and public organizations with interests in EE. State agency representatives (e.g., MDE, DNR) should hold positions in their respective agencies which provides them with the capability and resources to initiate EE policy, direction and other supportive actions.

A recommended make up of the board should include:

...the directors of the Departments of Education, Natural Resources, Public Health and Agriculture or their designee.

...two state legislators, one from the Senate and one from the House of Representatives.

...the acting president of the Michigan Alliance of Outdoor and Environmental Education.

...the executive director of Michigan United Conservation Clubs.

...representative of the Michigan Association of Conservation Districts

...one executive officer or designee of a major industry

...the executive director of the Michigan Environmental Council.

...three professional educators including one classroom teacher, one superintendent of a Michigan school district and one university teacher.

...two members at large.

The responsibilities of the state advisory board should include but not be restricted to:

...finding and facilitating new sources of funding for EE programs.

...reviewing and providing policy input on legislative activities which influence EE.

...review and respond to state policies which influence EE.

...annually identify environmental issues and recommend educational themes to provide direction to state environmental educators.

...initiate legislative actions which could support or enhance EE efforts in the state.

Recommendation 8:

Initiate search for creative and stable means to fund state level EE efforts.

Rationale:

Current resources are not readily available in either state agency to support new, long term leadership initiatives in EE.

Strategies:

Several strategies exist for funding an expanded EE program in the state. The final outcome will most likely include a combination of several of those listed.

New funding sources:

Temporary funds include grant programs made available by Foundations or Government agencies. Several major corporations also have shown interest in producing or assisting

In the development of EE programs in the state. These funds have the ability to provide initial start up monies but do not solve the long term, stable funding needs.

Permanent sources will most likely require legislative action and could include implementation of innovative revenue generators, foundation establishment and corporate donations.

Existing funding sources:

Opportunities may also exist for reallocation of existing personnel and budgets to provide a source of revenue for establishment of the program. While this strategy may seem the least desirable, if State agencies believe that EE is an integral part of their program this commitment should be made to reflect the importance of environmental education.

Recommendation Regarding Mandatory Environmental Education in Michigan

Several groups and individuals have expressed a desire for an EE mandate in Michigan. Our Committee discussed many pros and cons of this proposal and, although we are not prepared to make a recommendation, it is the majority opinion of the committee that mandating EE would not be an effective strategy at this time. A more detailed rationale for this response is provided in Appendix F.

APPENDIX A:
DNR-MDE Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING BETWEEN THE DEPARTMENT OF EDUCATION AND DEPARTMENT OF NATURAL RESOURCES

WHEREAS, Michigan has a unique abundance of varied and high quality natural resources, and the successful stewardship of those resources is largely dependent upon enlightened and responsible decision making by Michigan citizens, government, and private interests, and

WHEREAS, there is a need for the development of a practical, effective and coordinated approach by State government to the instruction of students in the history, current status, and future trends of environmental protection and resource management in Michigan, and

WHEREAS, the Departments of Education and Natural Resources are lead agencies in State government in educating and informing Michigan citizens about environmental protection and natural resource management

NOW, THEREFORE IT IS AGREED THAT:

1. The Department of Education and the Department of Natural Resources shall jointly establish an interagency task force and a citizens advisory committee to recommend a State environmental education policy.

The task force will consist of one lead staff member from each Department appointed by the Superintendent of Public Instruction and the Director of the Department of Natural Resources to co-chair; and such other staff members as deemed appropriate.

The citizens advisory committee shall consist of five members appointed by the Superintendent of Public Instruction and five members appointed by the Director of the Department of Natural Resources, representing students, teachers, school administrators, environmental organizations, resource management professionals and the general public.

The task force will recommend a proposed State environmental education policy and appropriate roles for each agency in providing leadership in environmental education to the Superintendent and the Director by December 31, 1989.

2. The Department of Education and the Department of Natural Resources jointly recognize the importance of instruction in environmental protection and natural resources management to improve Michigan's quality of life. The key to ensuring that environmental education is integrated into the classroom is to make certain that the objectives for various subjects contain an environmental education component. The Department of Natural Resources shall designate by June 1, 1989 a staff person to be a member of the Objective Revision Steering Committee which will develop the direction for the rewrite of the Science Objectives. As additional curriculum objectives are revised, the Department of Natural Resources will assign staff to ensure that environmental education is a component of the revised objectives. The Science Objectives will be compiled by October 1, 1989.

3. The Department of Natural Resources and the Department of Education believe an assessment of the knowledge possessed by the Michigan students on environmental and natural resources matters is a crucial element to ensure that environmental education is being fully integrated into the curriculum. The Department of Natural Resources will provide financial assistance to the Department of Education by June 1, 1989 to assist in designing the specific objectives and assessment mechanism for the environmental education component of the science objectives. The specific objectives and assessment mechanisms will be drafted by teams of experts in content, objective and test development.

4. The Department of Natural Resources and the Department of Education understand that curriculum is the critical component in ensuring that environmental education is successfully integrated into the classrooms. The Department of Natural Resources will designate a staff person to work with the Department of Education to develop curriculum support materials by June 1, 1990.

5. The Department of Education and the Department of Natural Resources will pursue by June 1, 1990, grant funding necessary to ensure curriculum development, dissemination of information, staff development and implementation of environmental education goals on a continuing basis.

Donald L. Bemis
Superintendent of Public Instruction
Department of Education

David F. Hales
Director
Department of Natural Resources

APPENDIX B:
Members of the Environmental Education Citizens Advisory Committee

Citizen Members

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APPENDIX C:
Review of Representative Environmental Education Programs in Selected States

Environmental Education in Selected States and Provinces

State or Province	Mandated	Staff Specialist	Special Funding	Other Initiatives
Missouri	No	Yes	Sales Tax	Agencies meet once a year to establish priority issues
Iowa	Yes	-	None	State Board of Ed. conducts annual in-service.
Illinois	No	Yes	None	Conservation Ed. Advisory Board established in 1970s. Dept. of Cons. conducts Kids for Conservation.
New Jersey	Yes	Part	None	Environmental Education Week
Wisconsin	Yes	Yes	None	Mandatory Pre-service, Wisconsin Environmental Ed. Board coordinates grants.
Colorado	-	-	None	Directory of Environmental Education Res. (DEER)
Florida	Yes	-	Video tax	Advisory Commission for Environmental
Ohio	No	Yes	Pollution Fines	Based on energy conservation, DNR has education specialists.
Alberta Canada	Yes	Yes	None	Prepared environmental support material for teachers, publishes newsletter.

APPENDIX D:
A Representative List of Environmental Education Activities in Michigan That Would be Enhanced by State Leadership to Achieve Coordination and Public Access

Environmental Education Activities:

Directories:

Directories	Audience	Organization	Availability
Conservation catalog	K-12	Michigan United Conservation Clubs	Upon request (printing charge)
Directory of Great Lakes Education Material	K-12	International Joint Commission	Upon request

Curricula:

Waste Information Series for Education (WISE)	K-12	Department of Natural Resources	Materials sent to every school building in the state.
Michigan Agriscience and Natural Resources	High School	Department of Education	Must attend workshop
Global Rivers Environmental Education Network	6-12	University of Michigan	Open to interested educators
A Ruffed Grouse Chase	6-12	Michigan State University	Upon request
Ground Water Education in Michigan Schools (GEMS)	K-12	Water Resources Institute, Michigan State University	Material available upon request

Supplemental Activity Sets:

Project WILD	K-12	Michigan Alliance for Environmental and Outdoor Education/Grand Rapids Junior College	Must attend a six hour workshop
Project Learning Tree (PLT)	K-12	MEAD Corporation and Department of Natural Resources	Must attend a six hour workshop
Wildlife in Michigan Schools	2-5	Wildlife Division	Upon request (printing charge)
Natural Resources and Environmental Education Activities	Informal Educat.	4-H Youth Programs	Available to 4-H youth leaders
Nature Scope	K-6	National Wildlife Federation	Upon request (printing charge)

Magazines			
Ranger Rick	3-6	National Wildlife Federation	Subscription Fee
Tracks	3-6	Michigan United Conservation Clubs	Subscription Fee
Puddler	3-5	Ducks Unlimited	Subscription Fee
Audubon Activist	6-12	National Audubon Society	Subscription Fee
Classroom Program			
Wildlife Discovery	4	Michigan United Conservation Clubs	Scheduled upon request
Wildlife Encounters	All	Michigan United Conservation Clubs	Scheduled upon request (fee charged)
Interplay: Designs for Environmental Awareness	All	West Michigan Environmental Action Council	Scheduled upon request
Rent a Rambling Naturalist	All	Will Redding	Scheduled upon request
Facilities			
Nature Centers	All	Various	Programs Scheduled at various times
Outdoor Education Centers	All	Various School Districts	Programs scheduled at various times
Summer Camps	4-8	4-H, MUCC, Private	Daily, weekly camps usually available in summer

In addition to the above materials, a wide variety of individual activities have been developed by the U.S. Fish and Wildlife Service, Soil Conservation Service, Environmental Protection Agency, Michigan Department of Natural Resources, and many other public and private groups.

Educators also have access to a wide variety of books, magazines, films, and videos that can be utilized in the classroom.

Professional Development Opportunities:

Formal Education

Project Wild	K-12 teachers	Grand Valley State College	Frequent workshops (fee charged)
Project Learning Tree	K-12 teachers	Michigan Department of Natural Resources	Workshops Infrequent (fees vary)
Higgins Lake Teachers Environmental School	K-12 teachers	State universities	Summer workshops (continuing ed credit available)
Michigan Science Teachers Association	K-12 teachers	MSTA	Annual Conf. (registration fee)
Michigan Detroit Science Teachers Association	K-12 teachers	MDSTA	Annual Conf. (registration fee)
Intermediate School Districts	K-12 teachers	Various ISDs	Occasional workshops during school year
Environmental Education courses	K-12 teachers	Various universities and colleges	Occasional classes (tuition fees)
Groundwater Education in Michigan	K-12 teachers	Institute for Water Research (MSU)	Occasional workshops
SEEPUP	K-12 teachers	Northern Michigan University	Workshops conducted primarily in the Upper Peninsula
SEE-NORTH	K-12 teachers	University of Michigan Biological Station	Workshop conducted in Northern Michigan

Nonformal Education

4-H Staff and Youth leadership	4-H youth and adults	Cooperative Extension Service	Workshops conducted throughout state
Girl and Boy scout staff leadership	Scout leaders	Various girl and boy scout councils	Dependent on scout councils
Teacher, docents, youth leaders	Adults	Various private and public organizations: Zoos, public museums, DNR facilities	
Weekend Courses	Teachers and public	Michigan United Conservation Clubs	Winter and fall weekend courses offered
Soil Conservation Districts	SCD staff	SCD	primarily staff development

APPENDIX E:
A Model Illustrating a Set of Student Outcomes For EE in Michigan

The Superordinate Goal: ... to aid citizens in becoming environmentally knowledgeable and, above all, skilled and dedicated citizens who are willing to work, individually and collectively, toward achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment.

Michigan Environmental Education Policy Statement: Michigan's environmental education goal is to develop environmental responsibility in the populace. Environmental responsibility must begin by empowering people, individually and collectively, to address environmental issues, whether they live in urban, suburban, or rural communities. Environmental education will enable individuals to understand the connection between air, land, water and living systems in their environment as well as how these systems relate to the global environment. At the same time environmental education will make it possible for individuals to protect, foster and conserve their environment and use its resources in a wise and prudent fashion.

Goal Level I. The Ecological Foundations Level

This level seeks to provide learners with sufficient ecological knowledge to permit him/her to eventually make ecologically sound decisions with respect to environmental issues.

Student Outcomes:

A. State the first and second laws of thermodynamics in nontechnical terms and correctly illustrate how those physical laws influence the existence of our environment.

B. Describe the physiological needs of individual organisms and relate these to the habitat requirements of populations in an ecosystem.

C. Define the concept of limiting factors and relate the concept to population growth of species in a given ecosystem.

D. Explain and relate the roles of mortality, natality, emigration, immigration, intrinsic factors and extrinsic factors in the changes in population sizes over time.

E. Describe the natural tendencies in population dynamics for a species in a healthy habitat.

F. Describe and provide Michigan examples of species interactions including: competition, predation, parasitism, commensalism, mutualism, and amensalism.

G. Describe, contrast and relate energy flow and nutrient cycles in ecosystems.

H. Given a Michigan ecosystem, diagram the specifics of energy flow and nutrient cycles, describing accurately at least some of the actual species involved in these processes and their roles.

I. Describe the complexity of ecosystems in terms of species interactions, energy flow, nutrient cycling, succession, diversity and stability.

J. Define and contrast the concepts of ecological community and ecosystem.

K. Accurately describe the process and stages of succession in one Michigan and one non-Michigan ecosystem.

L. Describe the current roles of humans as members of ecosystems in Michigan and the world.

M. The ecological implications of human activities and communities.

Goal Level II. The Conceptual Awareness Level - Issues and Values

This level seeks to guide the development of a conceptual awareness of how individual and collective actions may influence the relationship between quality of life and the quality of the environment and, also, how these actions result in environmental issues which must be resolved through investigation, evaluation, values clarification, decision making, and finally, citizenship action.

Student Outcomes:

A. Describe how human cultural activities (e.g., religious, economic, political, social, etc.) influence the environment from an ecological perspective.

B. Describe examples which illustrate how individual behaviors impact on the environment from an ecological perspective.

C. Identify a wide variety of current environmental issues and describe the ecological and cultural implications of these issues.

D. Select current environmental issues, describe the alternative solutions available for solving these issues and the ecological and cultural implications of these solutions.

E. Recognize the need for environmental issue investigation and evaluation as a prerequisite to sound decision making.

F. Discuss the roles played by differing human values in issues and the need for personal values clarification as an integral part of environmental decision making.

G. Describe the need for responsible citizenship action in resolving environmental issues.

Goal Level III. The Investigation and Evaluation Level

This level provides for the development of the knowledge and skills necessary to permit learners to investigate environmental issues and evaluate alternative solutions for solving these issues. Similarly, values are clarified with respect to these issues and alternative solutions. An explicit dimension of this goal level is to not only develop the identified skills below, but to provide educational opportunities for students to participate in their use.

Student Outcomes:

A. Demonstrate the knowledge and skills needed to identify and investigate issues and to synthesize the gathered information.

B. Demonstrate the ability to analyze environmental issues and the associated value perspectives with respect to their ecological and cultural implications.

C. Demonstrate the ability to identify alternative solutions for specific issues an the value perspectives associated with these solutions.

D. Demonstrate the ability to evaluate alternative solutions and associated value perspectives for specific issues with respect to their cultural and ecological implications.

E. Demonstrate the ability to identify and clarify their own value positions related to specific issues and their associated solutions.

F. Demonstrate the ability to evaluate, clarify and change their own values positions in light of new information.

G. Given an opportunity, participate in environmental issue investigation and evaluation.

H. Given an opportunity, participate in the valuing process in a manner as to permit the learner to evaluate the extent to which his/her values are consistent with the superordinate goal for environmental education.

Goal Level IV. Action Skills Level - Training and Application

This level seeks to guide the development of those skills necessary for receivers to take positive environmental action for the purpose of achieving and/or maintaining a dynamic equilibrium between quality of life and the quality of the environment. As with Goal Level III, an explicit dimension of this goal level is to not only develop the identified skills below, but to provide educational opportunities for students to participate in their use.

Student Outcomes: Demonstrate those skills which will permit them to (1) effectively work toward environmental solutions which are consistent with their values and (2) take either individual or group action when appropriate.

A. Correctly and thoroughly investigate and evaluate a selected environmental issue or problem.

B. Identify and evaluate the effectiveness of alternative solutions to the problem/issue.

C. Accurately consider relative values (of self and society) and how they would be impacted by alternative solutions.

D. Identify appropriate strategies needed to achieve selected alternative solutions.

E. Given an opportunity, make decisions concerning action strategies to be used with respect to particular environmental issues which correctly consider affected values, costs and benefits to self, society and the environment.

F. Given an opportunity, implement action skills to take citizen action on one or more issues.

G. Evaluate the actions taken with respect to their influence on achieving and/or maintaining a dynamic equilibrium between the quality of life and the quality of the environment.

APPENDIX F:
Comments on the Need for Mandatory Environmental Education

In recognition of the importance of environmental education, some groups and individuals have advocated that environmental education be mandated by law. The appeal is simple. The passage of a single bill would immediately cause every school district to think about environmental education - maybe for the first time. But there are also dangers with choosing this as the focal strategy in our efforts to promote environmental education.

For a number of reasons, the Citizens Environmental Education Advisory Committee has taken the position that mandating environmental education is not the preferred strategy for enhancing EE in the state. First of all, current law under the Headlee Amendment requires that the State must fully fund any mandated program. Because of the current financial crisis in Michigan, very little environmental education would be funded. Therefore most of what we want environmental education to be could not be mandated. The result would most likely be a shallow gesture rather than a substantive change in curriculum. If more than token legislation was proposed, it most certainly would not pass.

Even if environmental education was mandated, it may not make a difference (or the desired difference) in the education of our youth. Consider the example of Public Act 269 (1955). This law mandates that all public schools in Michigan must teach about protection of animals. Yet probably less than a dozen teachers and administrators know about this law. This mandate has had little or no effect on education in Michigan. Without promotion, enforcement, or incentives a law enacted in Lansing may have no impact at all.

Even with modest enforcement, a vaguely worded mandate would allow any school to document compliance without changing anything. On the other hand, an extensive mandate without appropriate explanation and inservice may generate more resentment than effective environmental education.

Educational mandates also only apply to public schools. If school financing is used as the enforcement or incentive tool, then the mandate is effective only with "in formula" schools. Environmental education should be a part of everyone's education. We should choose strategies for promoting environmental education that potentially could reach every school and every educator.

Even with a mandate we would certainly need and want such things as leadership and advocacy for environmental education, support for professional development, a clearinghouse for educational resources, etc. There is a danger that some people will think that an environmental education mandate is all that is needed - and once enacted they will shift their attention elsewhere without working for the rest of what is needed.

Finally, there are some attitudes which might limit the coalition building needed to adopt a strategy for promoting environmental education. Some people are philosophically opposed to mandates or see them as undesirable. Local control and academic freedom are doctrines fervently espoused by some who would fight environmental education mandates. Other people, because of the belief that education mandates would never be passed in Michigan, would refuse to take the proposal seriously and would not join an effort to pass such a proposed law.

The report of the Citizens Environmental Education Advisory Committee outlines a variety of effective strategies for promoting environmental education in Michigan. All of them can be implemented without mandating environmental education. It is our feeling that support of these recommendations should be a higher priority than mandates.

Appendix E

Michigan Essential Goals and Objectives for Science Education
Environmental Education Objectives
March 1994

C1	Generate reasonable questions about the world, based on observation.
C2	Develop solutions to unfamiliar problems through reasoning, observation, and/or experiment.
C3	Manipulate simple mechanical devices and explain how they work.
C4	Use simple measurement devices to make metric measurement.
C5	Develop strategies and skills for information gathering and problem solving.
C6	Construct charts and graphs and prepare summaries of observations.
C7	Generate scientific questions about the world, based on observation.
C8	Design and conduct simple investigations.
C9	Investigate toys/simple appliances and explain how they work, using instructions & appropriate safety . . .
C10	Use measurement devices to provide consistency in an investigation.
C11	Use sources of information to help solve problems.
C12	Write and follow procedures in the form of step-by-step instructions, recipes, formulas, flow diagrams, and . .
C13	Develop questions or problems for investigation that can be answered empirically.
C14	Suggest empirical tests of hypotheses.
C15	Design and conduct scientific investigations
C16	Diagnose possible reasons for failures of mechanical or electronic systems.
C17	Assemble mechanical or electronic systems using appropriate tools and instructions.
C18	Recognize and explain the limitations of measurement devices.
C19	Gather and synthesize information from books and other sources of information.
C20	Discuss topics in groups by being able to restate or summarize what others have said, ask for clarification . . .
C21	Reconstruct previously learned knowledge.
R1	Develop an awareness of the need for evidence in making decisions scientifically.
R5	Develop an awareness of contributions made to science by people of diverse backgrounds.
R7	Describe limitations in personal knowledge.
R10	Recognize the contributions made by individuals of diverse cultural and economic backgrounds to scientific...
R11	Justify plans or explanations on a theoretical or empirical basis.
R13	Explain how common themes of science, mathematics, and technology apply in selected, real-world contexts.
R16	Describe the historical, political, and social factors affecting developments in science.
LC6	Explain how multi-cellular organisms grow, based on how cells grow and reproduce.
LC7	Compare and contrast ways in which selected cells are specialized to carry out particular life functions.
LC8	Compare and contrast the chemical composition of selected cell types.
LC9	Compare the transformations of matter and energy during photosynthesis and respiration.
LO1	Compare and classify familiar organisms on the basis of observable physical characteristics.
LO4	Compare and contrast food, energy, and environmental needs of similar organisms.
LO8	Describe evidence that plants make and store food.
LO9	Explain how selected systems and processes work together in plants and animals.
LO11	Describe the life cycle of an organism associated with human disease.
LO12	Explain the process of food storage and food use in organisms.
LO13	Explain how living things maintain a stable internal environment.
LO14	Describe technology used in the prevention, diagnosis, and treatment of diseases.
LH3	Describe how heredity and environment may influence/determine characteristics of an organism.
LE2	Explain how physical and/or behavioral characteristics of organisms help them to survive in their environments.
LEC1	Identify familiar organisms as part of a food chain or food web & describe their feeding relationships within . .
LEC2	Explain common patterns of interdependence and interrelationships of living things.

Michigan Essential Goals and Objectives for Science Education
Environmental Education Objectives
March 1994

LEC3	Describe the basic requirements for all living things to maintain their existence.
LEC4	Describe systems that encourage growing of particular plants or animals.
LEC5	Describe positive and negative effects of humans on the environment.
LEC6	Describe common patterns of relationships among populations.
LEC7	Predict the effects of changes in one population in a food web on other populations.
LEC8	Describe how all organisms in an ecosystem acquire energy directly or indirectly from sunlight.
LEC9	Describe the likely succession of a given ecosystem over time.
LEC10	Identify some common materials that cycle through the environment.
LEC11	Describe ways in which humans alter the environment.
LEC12	Explain how humans use and benefit from plant and animal materials.
LEC13	Describe common ecological relationships among species.
LEC14	Explain how energy flows through familiar ecosystems.
LEC15	Describe general factors regulating population size in ecosystems.
LEC16	Describe responses of an ecosystem to events that cause it to change.
LEC17	Describe how water, carbon dioxide, and soil nutrients cycle through selected ecosystems.
LEC18	Explain the effects of agriculture and other human activities on selected ecosystems.
PME1	Classify common objects and substances according to observable attributes: color, size, shape, smell . . .
PME3	Identify properties of materials that make them useful.
PME4	Identify forms of energy associated with common phenomena.
PME13	Describe energy and the many common forms it takes (mechanical, heat, light, sound, electrical).
PME14	Describe how common forms of energy can be converted, one to another.
PME19	Analyze properties of common household and agricultural materials in terms of risk/benefit balance.
PCM3	Construct simple objects that fulfill a technological purpose.
PCM6	Distinguish between physical and chemical changes in natural and technological systems.
PCM7	Describe how waste products accumulating from natural and technological activity create pollution.
PCM11	Trace, to an original source, the energy used by living things and machines.
PCM12	Describe how common materials are made and disposed of or recycled.
PCM15	Describe energy changes associated with physical and chemical changes.
PCM16	Describe, compare, & contrast relative magnitude of energy changes involved in physical, chemical, nuclear . .
EG2	Recognize and describe different types of earth materials.
EG3	Explain how rocks and fossils are used to understand the history of the earth.
EG4	Describe natural changes in the earth's surface.
EG5	Describe uses of materials taken from the earth.
EG6	Demonstrate means to recycle manufactured materials and a disposition toward recycling.
EG7	Describe and identify surface features using maps.
EG8	Explain how rocks and minerals are formed.
EG9	Explain how rocks and fossils are used to determine the age and geological history of the earth.
EG10	Explain how rocks are broken down, how soil is formed, and how surface features change.
EG11	Explain how technology changes the surface of the earth.
EG14	Explain how and why earth materials are conserved and recycled.
EH1	Describe how water exists on earth in three states.
EH2	Trace the path that rain water follows after it falls.
EH3	Identify sources of drinking water.
EH4	Describe uses of water.

Michigan Essential Goals and Objectives for Science Education
Environmental Education Objectives
March 1994

EH5	Describe various forms that water takes on the earth's surface and conditions under which they exist.
EH6	Describe how rain water in Michigan reaches the oceans.
EH7	Describe the origins of pollution in the hydrosphere.
EH8	Explain how water moves below the earth's surface.
EH9	Explain relationships between the hydrosphere, regional climates, and human activities.
EH10	Describe how human activities affect the quality of water in the hydrosphere.
EAW1	Describe the atmosphere.
EAW2	Describe weather conditions and climates.
EAW3	Describe seasonal changes in weather.
EAW4	Explain appropriate safety precautions during severe weather.
EAW5	Describe the composition and characteristics of the atmosphere.
EAW6	Describe patterns of changing weather and how they are measured.
EAW7	Explain the water cycle and its relationship to weather patterns.
EAW8	Describe health effects of polluted air.
EAW9	Describe patterns of air movement in the atmosphere and how they affect weather conditions.
EAW10	Explain and predict general weather patterns and storms.
EAW11	Explain changes in climate over long periods of time.
EAW12	Explain the impact of human activities on the atmosphere & demonstrate means for limiting pollution.
ES1	Describe the sun, moon, and earth.
ES2	Describe the motions of the earth and moon around the sun.

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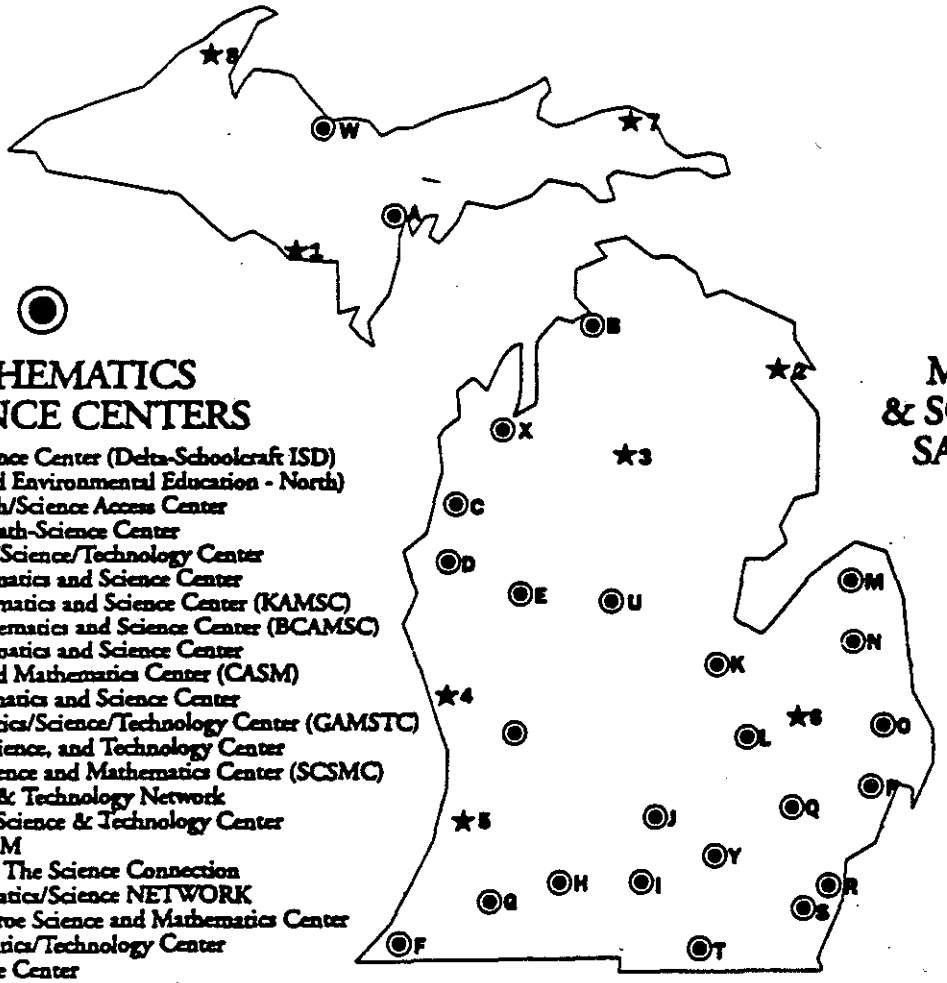
Appendix F

MATHEMATICS AND SCIENCE CENTERS IN TODAY'S SOCIETY

Today's changing society and the dynamics of our economy demand that the education community significantly improve the mathematical power and scientific literacy of our citizens. What is taught and what is learned must not be based on the superficial transmission of knowledge. Rather, our premise should be that science is a process for answering questions about the world and mathematics is a language for describing patterns and order in the world.

Michigan stands out in its response to the call for reform. The Michigan Legislature supports the improvement of mathematics and science learning and teaching through the Mathematics and Science Centers Program. This Program provides funds for 25 Centers and eight satellites around the state.



MATHEMATICS & SCIENCE CENTERS

- Northwoods Math Science Center (Delta-Schoolcraft ISD)
- EE-North (Science and Environmental Education - North)
- Manistee Regional Math/Science Access Center
- Mason-Lake-Oceana Math-Science Center
- Tecosta-Osceola Math/Science/Technology Center
- Berrien County Mathematics and Science Center
- Kalamazoo Area Mathematics and Science Center (KAMSC)
- Battle Creek Area Mathematics and Science Center (BCAMSC)
- Jackson County Mathematics and Science Center
- Capital Area Science and Mathematics Center (CASM)
- MSU Regional Mathematics and Science Center
- Genesee Area Mathematics/Science/Technology Center (GAMSTC)
- Huron Mathematics, Science, and Technology Center
- Tuscola County ISD Science and Mathematics Center (SCSMC)
- St. Clair Math, Science & Technology Network
- Macomb Mathematics, Science & Technology Center
- Oakland Schools - PRISM
- Detroit Public Schools - The Science Connection
- Wayne County Mathematics/Science NETWORK
- Washtenaw-Lenawee-Monroe Science and Mathematics Center
- CMU Science/Mathematics/Technology Center
- GVSU Math and Science Center
- The Seaborg Center - Northern Michigan University
- Grand Traverse Area Regional Mathematics, Science, and Technology Center
- Livingston-Washtenaw Math/Science Center

MATHEMATICS & SCIENCE CENTER SATELLITE SITES

1. Dickinson-Iron ISD
2. AMA/Iosco
3. COOR ISD
4. Muskegon ISD
5. Allegan ISD
6. Lapeer ISD
7. Eastern UP ISD
8. Copper Country ISD

For more information about the Center serving your area, contact the Curriculum Development Unit at the Michigan Department of Education, P.O. Box 30008, Lansing, Michigan 48909, or telephone 517-373-1236.

PARTNERS AND CONNECTORS

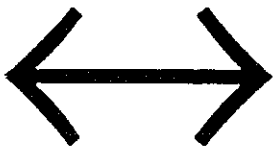
Michigan Mathematics and Science Centers help communities, schools, educators and students improve their schools. As knowledgeable partners, Centers ensure that various initiatives in mathematics and science are coordinated within a region, that resources are used efficiently, and that programs and services address the real needs of educators and the students with whom they work.

Centers are not the sole providers of services in mathematics and science. Rather, Centers are key elements in the infrastructure that connects a variety of stakeholders within a region and across the state in ways that foster collaboration, cooperation and continual improvement in teaching and learning.

BASIC SERVICES PROVIDED BY EVERY CENTER

Every Center provides:

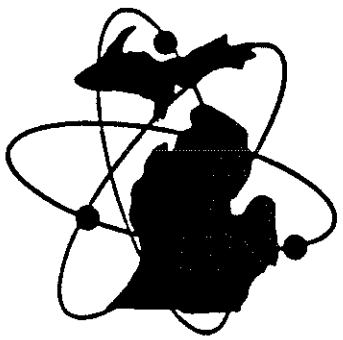
Leadership
Student Services
Curriculum Support
Community Involvement
Professional Development
Resource Clearinghouse



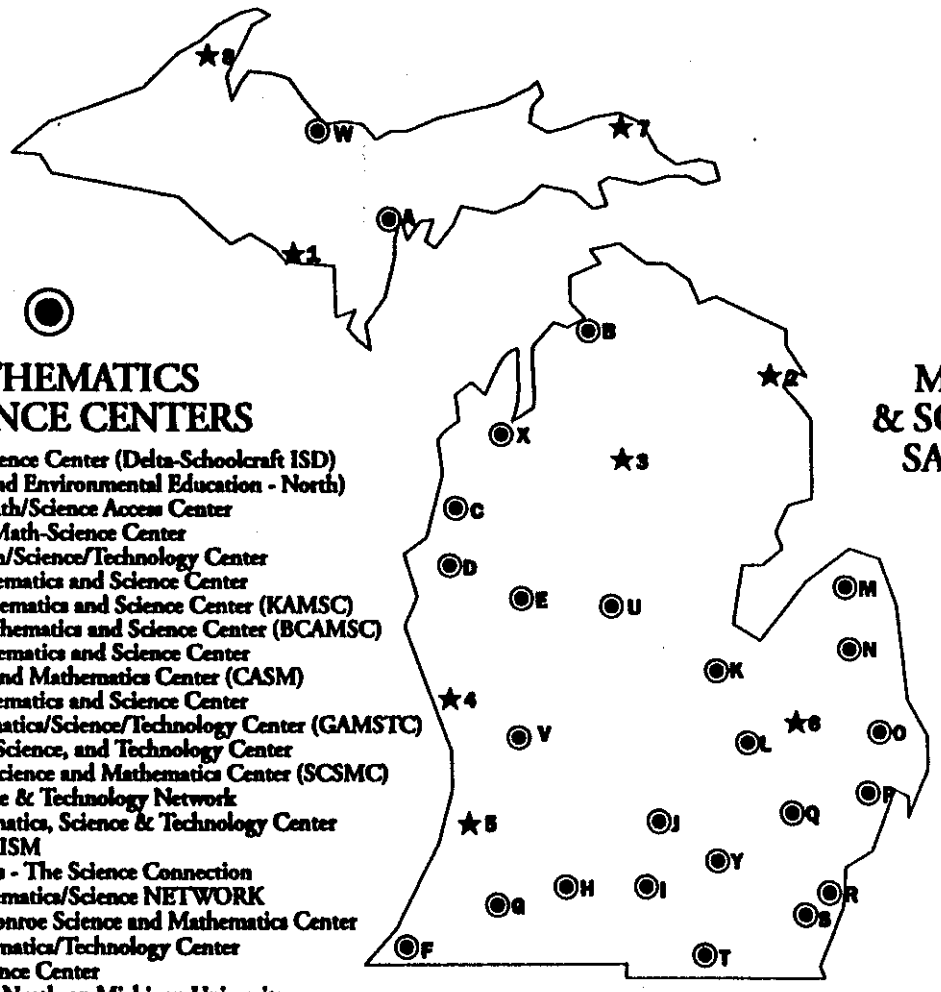
And interacts with:

Educators and Students
Parents and Communities
School Districts
Higher Education
Education Organizations
Business and Industry

MICHIGAN MATHEMATICS AND SCIENCE CENTERS PROGRAM



Schools, communities, colleges and universities, businesses, industries, and state government have joined forces to create Centers around our state to improve mathematics and science education.



MATHEMATICS & SCIENCE CENTERS

- **A** Northwoods Math Science Center (Delta-Schoolcraft ISD)
- **B** SEE-North (Science and Environmental Education - North)
- **C** Manistee Regional Math/Science Access Center
- **D** Mason-Lake-Oceana Math-Science Center
- **E** Mecosta-Osceola Math/Science/Technology Center
- **F** Berrien County Mathematics and Science Center
- **G** Kalamazoo Area Mathematics and Science Center (KAMSC)
- **H** Battle Creek Area Mathematics and Science Center (BCAMSC)
- **I** Jackson County Mathematics and Science Center
- **J** Capital Area Science and Mathematics Center (CASM)
- **K** SVSU Regional Mathematics and Science Center
- **L** Genesee Area Mathematics/Science/Technology Center (GAMSTC)
- **M** Huron Mathematics, Science, and Technology Center
- **N** Sanilac County ISD Science and Mathematics Center (SCSMC)
- **O** St. Clair Math, Science & Technology Network
- **P** Macomb ISD Mathematics, Science & Technology Center
- **Q** Oakland Schools - PRISM
- **R** Detroit Public Schools - The Science Connection
- **S** Wayne County Mathematics/Science NETWORK
- **T** Hillsdale-Lenawee-Monroe Science and Mathematics Center
- **U** CMU Science/Mathematics/Technology Center
- **V** GVSU Math and Science Center
- **W** The Seaborg Center - Northern Michigan University
- **X** Grand Traverse Area Regional Mathematics, Science, and Technology Center
- **Y** Livingston-Washtenaw Math/Science Center

MATHEMATICS & SCIENCE CENTER SATELLITE SITES

1. Dickinson-Iron ISD
2. AMA/Iosco
3. COOR ISD
4. Muskegon ISD
5. Allegan ISD
6. Lapeer ISD
7. Eastern UP ISD
8. Copper Country ISD

As of October 1, 1994

CURRENT AND FUTURE (October 1, 1994) MATHEMATICS AND SCIENCE CENTERS DIRECTORS March 1994

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Ms.	Michal	Brody	Mason-Lake-Oceana Math-Science Center	616/845-6211	616/845-7227	3000 N. Stiles Road	Scottville, MI 49454
Ms.	Johanna	Brown	Genesee Area M/S/T Center	810/768-4495	810/768-7570	2413 West Maple Ave.	Flint, MI 48507
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Mr.	Don	Griffin	Wayne County Mathematics/Science NETWORK	313/467-1581	313/326-2610	33500 Van Born Rd.	Wayne, MI 48184
Ms.	Debra	Homeier	Northwoods Math Science Center	906/786-9300	906/786-9318	2525 Third Ave South	Escanaba, MI 49829
Dr.	David	Housel	Oakland Schools - PRISM	810/858-2034	810/683-9438	1480 Scott Lake	Waterford, MI 48328
Mr.	Ray	Leising	Hillsdale-Lenawee-Monroe S/M Center	517/265-1623	517/265-7405	4107 N. Adrian Hwy	Adrian, MI 49221
Dr.	Michael	Marlow	Jackson County Mathematics and Science Center	517/787-2800	517/787-2026	6700 Browns Lake Rd	Jackson, MI 49201
Ms.	Jenny	McCampbell •	Capital Area Science and Mathematics Center	517/224-6831	517/224-9574	P. O. Box 438	St. Johns, MI 48879
Ms.	Rita	McNeely	St. Clair Math, Science & Technology Network	810/364-8990	810/364-7474	499 Range Rd.	Port Huron, MI 48061
Ms.	Vnona	Miller	Sanilac County ISD Science and Mathematics Center	810/648-4700	810/648-4834	175 East Aitken Road	Peck, MI 48466
Dr.	Terry	Parks	Battle Creek Area Mathematics and Science Center	616/965-9440	616/965-9589	765 Upton Ave	Battle Creek, MI 49015-4894
Dr.	Gerard	Putz	Macomb ISD M/S/T Center	810/228-3467	810/286-1523	44001 Garfield Road	Clinton Township, MI 48038
Dr.	Walter	Rathkamp	SVSU Regional Mathematics and Science Center	517/790-4114	517/790-1614	7400 Bay Road	University Center, MI 48710
Dr.	Wayne	Schade	Kalamazoo Area Mathematics and Science Center	616/337-0004	616/337-0049	600 West Vine Street, Suite 400	Kalamazoo, MI 49008
Mr.	David	Walsh	Macomb ISD M/S/T Center	810/574-3171	810/574-3221		Warren, MI 48092
Dr.	Mary	Whitmore	SEE-North	616/348-9700	616/348-1085	03001 Church Road	Petoskey, MI 49770
Dr.	Carolyn	Hannum ••	Livingston-Washtenaw Math/Science Center	517/546-5550	517/546-7047	1425 W. Grand River Ave.	Howell, MI 48843
Dr.	Peggy	House ••	The Seaborg Center - Northern Michigan University	906/227-2002	906/227-2013	1401 Presque Isle	Marquette, MI 49855
Dr.	Michelle	Johnston ••	Grand Traverse Area Regional M/S/T Center	616/922-1731	616/922-1732	1701 E. Front St.	Traverse City, MI 49684
Ms.	Mary Ann	Sheline ••	GVSU Math and Science Center	616/895-2265	616/895-3412	Science and Mathematics Center	Allendale, MI 49401
Dr.	Karen	Swift ••	CMU Science/Mathematics/Technology Center	517/774-4387	517/774-3152	Central Michigan University	Mt. Pleasant, MI 48859

• INTERIM DIRECTOR MDE CONTACT PERSON - SUE K. HARRISON 517-373-1236
•• Sites as of October 1, 1994

STATE OF MICHIGAN

MATHEMATICS AND SCIENCE CENTERS NETWORK

MISSION STATEMENT

December 1, 1989
Updates September 1992 and September 1993

The mission of the Mathematics and Science Centers Network is to foster the development and operation of Mathematics and Science Centers, which bring together educators from local and intermediate school districts, universities and community colleges, and science and technology museums with leaders from business, industry, government, and communities to provide the following basic services:

- **Leadership**, based on national and state goals, to improve mathematics and science education by strengthening and evaluating teaching and learning;

- **Student Services** to improve and enhance mathematics and science education (e.g., programs for underrepresented groups, high-potential students, and after-school classes);

- **Curriculum Support** to develop curricula incorporating both national research in teaching and learning as well as the state's *Essential Goals and Objectives* and the *Model Core Curriculum Outcomes*;

- **Community Involvement** to increase awareness of each Center, to nurture the idea of community ownership of each Center, and to provide resources for innovative educational programming;

- **Professional Development** to sequentially and systemically strengthen teaching practices based on local needs and current research; and

- **Resource Clearinghouse**—in collaboration with university and community colleges, museums, and other groups—to collect and disseminate information, acquire and distribute materials, and find and schedule human resources.

The Mathematics and Science Centers Network will facilitate statewide efforts by providing communication channels, leadership, and resources for evolving Centers.

MATHEMATICS AND SCIENCE CENTERS NETWORK GOALS

September 5, 1991
Updated September 1992 and September 1993

Membership

Membership in the Mathematics and Science Centers Network is governed by its bylaws.

Leadership

The Network provides and develops leadership for excellence in mathematics and science education in Michigan and strengthens and evaluates teaching and learning based on national and state goals.

The Network is an advocate for the role of Centers in improving mathematics and science education. Audiences for advocacy include the State Legislature, the State Board of Education and professional organizations on the local, regional, state, and national levels.

The Network facilitates the development, maintenance, and evolution of the Centers by creating with the Michigan Department of Education a shared, long-range Master Plan for the Centers.

Communication

The Network facilitates communication among Centers. The Network strives to keep members informed about the status of the Centers' programs, solution to practical problems, new program ideas, strategies for evaluation, and the findings of new research in mathematics and science education.

The Network also promotes interactions between Centers and local school districts, professional organizations, Centers in other states, universities and community colleges, business and industry, governmental bodies, and other informal educational or community-based organizations.

Communication between the Network and the Michigan Department of Education, along with other key state agencies, serves to inform the Centers about programs and new initiatives in mathematics and science at the state level. The Centers in turn can help facilitate communication from the state to local school districts and other groups that are partners with Centers.

Resources

The Network develops and coordinates financial and human resources across the regions served by Centers. Development ensures that the effort expended today will result in a long-lasting initiative to improve mathematics and science education. Coordination ensures the most efficient use of resources in ways that provide access for all teachers and students in Michigan.

THE HISTORY OF THE MATHEMATICS AND SCIENCE CENTERS

The Mathematics and Science Centers Program established during the 1988-89 school year provides grants to establish Mathematics and Science Centers in cooperation with local and intermediate school districts, universities and community colleges, science museums, and state and national mathematics and science associations, as well as with leaders from business and industry. Since its inception, the Program has undergone several changes through revised legislation. The name of the program changed from Mathematics and Science Challenge Grant to Mathematics and Science Centers Program Grant. The Program initially required that public or private sources provide matching funds; that requirement no longer exists. Today, however, nearly every Center obtains external funding in addition to that provided through the State's Mathematics and Science Centers Program. Some Centers have formed excellent Partnerships with local businesses and industries, while others have tapped community groups or foundations. The result has been an impressive and collaborative effort by the schools, Centers, and communities to improve the quality of mathematics and science education in Michigan.

The initial Program also required each Center to conduct both accelerated programs for secondary students and outreach activities to improve mathematics and science in Kindergarten-12th grade. Today, Centers may operate an accelerated and innovative program, an outreach program, or both.

In 1988-89, Centers applied for grants worth $1,000,000 from the Department of Education Appropriation Bill. Twenty-five awards went to seventeen Centers. The initial categories included planning (create a five-year plan—$25,000), start-up and development (develop an accelerated program—$200,000), and outreach (extend the impact of the Center, coordinate K-12 curriculum reform, and facilitate systemic change—$100,000). The established Mathematics and Science Centers Network fosters developing and operating Centers by providing communication channels, leadership, and resources for their evolution.

In 1989-90, 27 awards worth $2,117,100 went to 20 Centers, including a continuing support category (support accelerated program—$75,000) added to the program. In 1990-91, 24 grants worth $1,872,100 went to 16 Centers.

In 1991-92, funding transferred from the Department Appropriation Bill to Section 99 of the State School Aid Act in the categories of Planning, Start-up and Development, Outreach, and Continuing Support. Twenty Centers received awards totaling $2,372,100 each. Six Centers received legislatively designated grants based on the population of their service area. The other 14 Centers received competitive grants. Planning, start-up, and development became one category with funding also based on the population of the service area. Centers serving populations of over 500,000 received the maximum grant award of $250,000; $200,000 for serving populations of 100,000-500,000; and $150,000 for populations of 100,000 or fewer. Outreach had no maximum grant award. The Mathematics and Science Centers Network hired an outside evaluator for the program.

In 1992-93, Section 99 of the State School Aid Act awarded $2,372,100 to all Centers funded in 1991-92, the same amount that they received in 1991-92. The legislation also required the Department, in cooperation with the House and Senate Fiscal Agencies, to develop a Master Plan for funding and operating the Centers. The Master Plan was submitted to the House and Senate appropriations subcommittees in February, 1993.

Appendix G

Act No. 310
Public Acts of 1994
Approved by the Governor
July 14, 1994
Filed with the Secretary of State
July 19, 1994

STATE OF MICHIGAN
87TH LEGISLATURE
REGULAR SESSION OF 1994

Introduced by Senators Hoffman, Ehlers, Gast, Dingell, Koivisto, McManus, Emmons, Wartner, Dunaskiss, Van Regenmorter, DiNello, Honigman, Gougeon, Cisky, Schwarz, Geake, Miller, Pollack, Pridnia, Conroy and Bouchard

ENROLLED SENATE BILL No. 927

AN ACT to promote environmental education in the state; to provide for an environmental education coordinator within the department of natural resources; and to prescribe the powers and duties of certain state agencies and officials.

The People of the State of Michigan enact:

Sec. 1. This act shall be known and may be cited as the "environmental education act".

Sec. 2. The purpose of this act is to facilitate an understanding by citizens of this state of the natural environment including an understanding of basic sciences, ecological sciences, and of the connection between human beings, air, land, water, and other living things, as well as how these systems relate to the global environment, thus making it possible for human beings to make informed decisions regarding protection and conservation of the environment and utilization of the natural resources in a wise and prudent fashion.

Sec. 3. As used in this act:

(a) "Coordinator" means the coordinator of environmental education provided for in section 4.

(b) "Department" means the director of the department of natural resources or his or her designee.

(c) "Director" means the director of the department of natural resources.

(d) "Environmental education" means the teaching of factual information of the natural environment, including basic sciences, ecological sciences, agricultural sciences, and other relevant subject matter, and the interdisciplinary process of developing a citizenry that is knowledgeable about the total environment and has the capacity and the commitment to engage in inquiry, problem solving, decision making, and action that will assure environmental quality.

Sec. 4. The department shall appoint a coordinator of environmental education within the department of natural resources. The coordinator's primary responsibilities shall be to do the following:

(a) Coordinate the efforts of the department of natural resources related to environmental education.

(b) Work with the department of education and with local education institutions, not-for-profit educational and environmental organizations, broadcasting entities, and private sector interests to support development of curricula, special projects, and other activities, to increase understanding of the basic sciences and of natural resources and the environment.

(c) Provide technical assistance to school districts, schools, and educators wishing to undertake projects including, but not limited to, water quality, air quality monitoring, or habitat protection.

(d) If an environmental education advisory committee is established pursuant to section 5, coordinate with the department in staffing the advisory committee.

(e) Provide assistance to the commission of natural resources in implementing statewide environmental education strategies developed by the department and the department of education.

(f) Assist in identifying grants or other sources of funding for innovative educators and students of environmental education.

(g) Recommend the appropriate mechanism for establishment of a clearinghouse of environmental education materials, which would make environmental education materials available to educators throughout the state.

(h) Provide or support existing training and professional development programs for educators.

(i) Assist in the incorporation of environmental education into curriculum objectives for the state's elementary and secondary schools and develop appropriate assessment mechanisms.

(j) Promote awareness of section 1171a of the school code of 1976, Act No. 451 of the Public Acts of 1976, being section 380.1171a of the Michigan Compiled Laws.

Sec. 5. (1) The director may establish an environmental education advisory committee. If the director establishes an environmental education advisory committee, the advisory committee shall be broadly representative of the following:

(a) Executive agencies.

(b) Environmental or conservation organizations.

(c) Business or industry.

(d) Individuals with knowledge and experience in general education.

(e) Individuals with knowledge and practical experience in environmental education.

(f) Individuals with knowledge and experience in the production of food and fiber products.

(g) The general public.

(2) If the director establishes an environmental education advisory committee under subsection (1), the director shall charge the advisory committee with 1 or more of the following responsibilities:

(a) To advise the coordinator, the department, and the department of education on matters related to environmental education in this state.

(b) To assist in coordination of and promotion of environmental education activities in the state.

(c) To coordinate and assist in the development of a scope and sequence model for environmental education in the state's elementary and secondary schools.

(d) To assist in the incorporation of environmental education into curriculum objectives for the state's elementary and secondary schools and develop appropriate assessment mechanisms.

(e) To coordinate and assist in the compilation of curriculum materials to assist in the utilization of the scope and sequence model developed pursuant to subdivision (c) and to meet curriculum objectives.

(f) To assist the coordinator in implementing a statewide environmental education strategies.

(g) To recommend appropriate teacher training.

(h) To perform other duties as identified by the director.

(3) The business which an environmental education advisory committee established under this section may perform shall be conducted at a public meeting of the advisory committee held in compliance with the open meetings act, Act No. 267 of the Public Acts of 1976, being sections 15.261 to 15.275 of the Michigan Compiled Laws. If established pursuant to this section, the environmental education advisory committee shall actively solicit public testimony at its meetings.

(4) Within 3 years after the effective date of this act, the director shall prepare and submit to the legislature a report that evaluates the effectiveness of this act and that recommends whether the environmental education advisory committee, if established pursuant to this section, should be continued.

Sec. 6. (1) The environmental education fund is created within the state treasury.

(2) The state treasurer shall direct the investment of the fund. The state treasurer may receive money or other assets from any source for deposit into the fund. Interest and earnings from fund investments shall be credited to the fund.

(3) Twenty-five percent of the civil fines collected annually under the following acts, but not more than $150,000.00 in any fiscal year, shall be appropriated to the fund:

(a) Act No. 245 of the Public Acts of 1929, being sections 323.1 to 323.13a of the Michigan Compiled Laws.

(b) The hazardous waste management act, Act No. 64 of the Public Acts of 1979, being sections 299.501 to 299.551 of the Michigan Compiled Laws.

(c) The solid waste management act, Act No. 641 of the Public Acts of 1978, being sections 299.401 to 299.437 of the Michigan Compiled Laws.

(4) Money in the fund at the close of the fiscal year shall remain in the fund and shall not lapse to the general fund.

(5) Money in the fund shall be used to implement this act and may be used for the establishment and operation of a clearinghouse of environmental education materials, which would make environmental education materials available to educators throughout the state.

This act is ordered to take immediate effect.

Secretary of the Senate.

Co-Clerk of the House of Representatives.

Approved _____

Governor.

Appendix H

6/23/94 Detroit News

Education vs. Indoctrination

A proposed Environmental Education Act has swept the Legislature with a lone vote in opposition to school-based environmental indoctrination. The measure deserves a swift kill by the governor.

The proposed act calls for an education coordinator within the Department of Natural Resources (DNR) to create a curriculum "making it possible for human beings to make informed decisions regarding protection and conservation of the environment and utilization of the natural resources in a wise and prudent fashion." Also a priority would be instilling "commitment to action that will assure environmental quality." Twenty-five percent of civil fines collected under a variety of environmental statutes would fund the program.

Pure and simple, the Greenpeace platform would become standard classroom fare. "Sustainable development, biodiversity, ecosystem management" and all the other socialistic propaganda would rank right up there with reading, writing and arithmetic. What's more, the DNR, whose regulatory schemes have so confounded the private sector, would foist yet another bureaucracy on Michigan's already beleaguered public schools.

The very best environmental education would be daily instruction in basic science: chemistry, biology and physics. A necessary part of this instruction is the scientific method — the testing of theories by the careful examination of evidence. Today's students, indeed most American citizens, desperately need intellectual tools to differentiate between hype and scientific fact. Ignorance of matters scientific has inflicted far more harm on the environment by way of costly and misguided regulation than any smokestack industry.

Such basics apparently didn't interest this bill's sponsor, nor the overwhelming majority of lawmakers who mindlessly approved of the measure.

But government-sponsored indoctrination is an affront to our most basic democratic and educational principles. Gov. John Engler owes the children of Michigan a veto on this mess.

Appendix I

ENVIRONMENT EDUCATION TASK FORCE

MEMBERSHIP ROSTER

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Natural Resources & Environmental Affairs
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Appendix J

The Grand Traverse Bay Watershed Initiative: A Local Partnership at Work

The Grand Traverse Bay Watershed Initiative is a long-term watershed management program endorsed by the International Joint Commission as a model of locally-driven pollution prevention for rapidly developing Great Lakes communities. The Initiative is managed through a local partnership agreement between 120 citizen, business and agency groups who seek to balance increasing development pressures with the need to preserve the high quality natural resources essential to the area's tourism and recreation industries. The Grand Traverse Bay is a deep, cold water inlet of northern Lake Michigan noted for its nearly pristine water quality. The watershed covers nearly 1000 square miles, dominated by agricultural and forestry land uses. Close to 100 inland lakes are found in the watershed, and more than twenty river tributaries flow into the Bay. Fifty five miles of blue ribbon trout streams are found in one subwatershed alone. More than 40 local government jurisdictions are within the watershed, many of which are experiencing rapidly growing human populations. Nonpoint sources of pollution, notably nutrient and sediment loading and atmospheric deposition, are the primary threats to water quality.

The Initiative, which officially began in 1990, has been largely supported by the "grass roots" efforts of local "partners", with limited private and public funds direced toward initial watershed evaluation projects. This bottom-up approach has proven to be a highly successful means of empowering the local community and demonstrates an alternative to the top-down, agency-driven or enforcement approaches commonly used remedial programs. Early successes included reaching consensus on the vision statement and specific goals of the Initiative and completing several watershed planning and pollution control projects. Subcommittees have begun to function independently to pursue action items needed to meet each goal.

Vision

"The ecological integrity of the Grand Traverse Bay Watershed will be sustained or restored to ensure regional economic viability and quality use by future generations."

Goals

Identify water quality and other resource problems in the wtershed and restore the environment where possible.

Create a computer model to simulate and/or predict ecological results of watershed activities.

People in the watershed are knowledgeable of their link to the area's environment and take responsibility for their actions.

Local units of government make well informed decisions which consider regional impacts on water quality and other resources.

Develop, implement and enhance conservation programs focused on protecting land and other resources within the watershed.

As the Grand Traverse Bay Watershed Initiative wraps up its third year, the partners are addressing challenges in the areas of publicity, funding and communications by taking several key actions: an institutional analysis that helped partners identify options for managing watershed resources, and convening an interim board of directors and employing a full time staff person to help position the Initiative to become self-sufficient in the future. Sustained funding of the Initiative presents the biggest challenge and the greatest opportunity for demonstrating a model approach that will benefit regional resource managers in other rapidly developing areas and in newly-restored resource areas of the future.

For further information on the Initiative, contact Jeanna M. Paluzzi, Coordinator, Grand Traverse Bay Watershed Initiative, 3197 Logan Valley Road, Traverse City MI 49684 USA; phone 616.946.6817; fax 616.946.4410.

12/93

Appendix K

cc: NRC Director

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF AGRICULTURE

P.O. BOX 30017, LANSING, MICHIGAN 48909

GORDON GUYER, Director

December 2, 1994

Mr. Larry DeVuyst, Chair
Natural Resources Commission
Department of Natural Resources
Steven T. Mason Building
P.O. Box 30028
Lansing, Michigan 48909

Dear Chairman DeVuyst: Larry

The Michigan Department of Agriculture is supportive of the Environmental Education Task Force proposal which makes recommendations that are designed to increase environmental awareness among Michigan citizens. As you are aware, the Michigan Relative Risk Analysis project identified the lack of environmental awareness among Michigan citizens as one of the priority issues that needed to be addressed. This proposal will provide a comprehensive solution to that issue. It is my recommendation that full implementation of this initiative be approved by the Natural Resources Commission.

Commissioner James Hill and his task force members should be commended for the thought and effort expended in developing this significant proposal. It is critical that Michigan continue to enhance the quality of its natural resources by increasing public awareness of environmental issues at all levels.

Please forward my letter of support to the members of the Natural Resources Commission and Director Roland Harmes. Once again, I ask that you give your utmost consideration and approval to this important initiative.

Sincerely,

Dr. Gordon Guyer
Director

GEG:KEC:bs

STATE OF MICHIGAN

DEPARTMENT OF EDUCATION

ROBERT E. SCHILLER
Superintendent
of Public Instruction

P.O. Box 30008
Lansing, Michigan 48909

November 9, 1994

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11-22-94

Mr. Roland Harmes
Director
Department of Natural Resources
P.O. Box 30028
Mason Building, Seventh Floor
Lansing, Michigan 48909

Dear Mr. Harmes:

The purpose of this letter is to express the Department of Education's complete and enthusiastic support for "The Michigan Relative Risk Task Force Report on Environmental Education" which will come before the Natural Resources Commission in the near future. This report presents a clear direction for coordinated efforts on environmental education between the Departments of Natural Resources and Education.

There are several recommendations made in the report with which I would like to emphasize the Department of Education's agreement and support:

- The interdisciplinary nature of environmental education is stressed throughout the report. This view fits closely with the proposed Core Curriculum Content Standards which address environmental issues across curriculum areas including science, geography, economics, and civics. The Department is developing ways to emphasize environmental education through an interdisciplinary focus of federally funded Curriculum Framework projects.

- The plan is appropriately focused on the collection of and dissemination of information about existing environmental education materials, rather than the creation of new materials. Michigan is home to many environmental education projects which can be tapped at the classroom level to enrich student learning.

- The need for coordination between formal and informal environmental education opportunities is critical. The Department of Education is committed to this coordination, even though the Department does not have specific staff exclusively assigned to environmental education.

The Environmental Education Task Force is to be complimented on its work. The Department of Education looks forward to working with the Department of Natural Resources to undertake environmental education initiatives.

Sincerely,

Bob

Robert E. Schiller

CC: NRC

CHITTENDEN EDUCATION CENTER

1070 Nursery Road
Wellston, MI 49689
(616) 848-4858
Fax - (616) 848-4005

Manistee Intermediate School District

Math/Science, Environmental Education, Technology: Keys For The Future

December 1, 1994

Mr. Larry DeVuyst
Chair, Natural Resources Commission
Department of Natural Resources
Stevens T. Mason Building
P.O. Box 30028
Lansing, MI 48909

Dear Mr. DeVuyst

I wanted to express my support for the Environmental Educator Specialist concept as presented by the Environmental Education Task Force. My support is based on these reasons:

1) Environmental illiteracy poses a great risk to our beautiful state. To combat illiteracy education is needed.

2) A comprehensive approach to environmental education is paramount. Addressing hunting or fishing, snowmobiling, bald eagle habitat maintenance, or any individual issue will result in a fragmented, biased, and thus less than -meaningful program. The holistic approach to fight environmental illiteracy is the **only** approach.

3) The regional Mathematics and Science Centers are the most logical vehicles for coordinating dissemination of environmental education information due to their locations throughout the state and their earned prestige within those respective service areas.

For these reasons, I strongly urge your commission to support the Task Force's recommendations as presented.

Respectfully,

J. Eric Farfsing
Director

JEF/bt

cc: NRC Director

December 1, 1994

Mr. Larry DeVuyst
Chair, Natural Resources Commission
Department of Natural Resources
Stevens T. Mason Building
P.O. Box 30028
Lansing, Michigan 48909

Dear Chairman,

I and my family have been avid sportspersons for many years in Michigan. Hence, I feel compelled to comment on the Environmental Education Specialist program currently under consideration by your Environmental Task Force.

If the Department of Natural Resources along with the hunting and fishing rights of our citizens are to remain viable into the next century we must educate our population. With the base of information held by humankind accelerating at an unbelievable rate our schools are charged with a monumental task. Given no more time in the day or days in the year, only so much information may be passed on as common knowledge. Therefore, much of what we call 'Natural Resources' is ever increasingly being overlooked in educational curriculum. There simply is not enough time in the day or dollars in the budget.

There appears, today, to be a growing lack of true understanding and appreciation of nature. Many people are truly concerned for our nature and wildlife but are greatly misinformed. These people often discount the human factor. Humans have been part of the balance of nature for many years. In doing so they, for example, strove to destroy the fur industry, never considering the impact the imbalance of fur bearing animals might have on fish, birds, habitat, and on through the food chain. This is just one simple example of the lack of understanding of people today. The only way to change this is through education.

In conclusion, I offer the support of this sportsman. There could not be a better use of our time and money than to assist in assuring the viability of our resources through education. Only by helping children understand nature and our role in it through science can we hope to produce adults who treasure our natural resources for what they are. I ask this for my three year old son, that he be assured the opportunities I have been given.

Thank you for your time.

Sincerely,

Thomas E. Johnson
291 6th Avenue
Manistee, MI 49660

cc: NRC

Hillsdale, Lenawee & Monroe Math/Science Center

2345 N. Adrian Hwy
Adrian, MI 49221
(517) 265-1667

November 29, 1994

Mr. Larry DeVuyst
Chairman, Natural Resources Commission
Department of Natural Resources
Stevens T. Mason Building
PO Box 30028
Lansing, MI 48909

Dear Mr. DeVuyst:

I am the director of the Hillsdale-Lenawee-MonroeMath/Science Center. Formerly I was the environmental education consultant for the Muskegon Area Intermediate School District and also a Math/Science high school teacher for over 10 years.

I firmly believe that the citizens of Michigan would like to pass on to the next generation an environmental legacy. A legacy rooted in the philosophy that the quality of life is directly tied to the integrity of the environment. In order for us to fulfill this legacy we must help students develop an awareness and sensitivity to the environment. This requires an understanding on how the environment functions, how people interact with it and how environmental issues and problems arise and are resolved.

Stewardship of our environment requires a local and global perspective. We need to have environmentally trained teachers in all our schools to aid students in discovering this perspective. The solution to the environmental crisis rests neither with scientists nor with government officials, but with a citizenry educated in environmental problem solving. This education must occur in our schools, but often our teachers have inadequate background in these manners.

The placement of trained environmental specialists charged with environmental professional development in the Math/Science centers will allow all (urban as well as suburban and rural) students to become concerned environmental stewards.

I would like to offer my support for the Environmental Education Proposal. If I can be of service, please feel free to call me.

Sincerely,

Tom Green

Tom Green, Director
Hillsdale, Lenawee and Monroe
Math/Science Center

cc: Mr. Pete Vunovich

cc: NRC
D. Freed

Michigan Institute of Laundering & Drycleaning, Inc.

P.O. Box 14044 • Lansing, MI 48901 • (517) 337-2909

November 23, 1994

Mr. Larry DeVuyst
Chair, Natural Resources Commission
Department of Natural Resources
Stevens T. Mason Building
P.O. Box 30028
Lansing, Michigan 48909

Dear Chairman DeVuyst:

It is my understanding that the Natural Resources Commission will be meeting on December 8th and the Environmental Education Task Force Report will be on the agenda.

After reading the EE Task Force Report and having had some input during the course of development of the report, I find the process and the final product to have been comprehensive and well thought out. I believe the subject of environmental education for not only K-12 grades but the entire public, to be long overdue and applaud the Governor, DNR and Commissioner Hill for the efforts put forth.

I, and the organization I represent, Michigan Institute of Laundering & Drycleaning (MILD), strongly support "The Michigan Relative Risk Task Force Report on Environmental Education". And we encourage the DNR to dedicate the necessary funding to support the program as addressed in the EE Report.

On behalf of myself and MILD, I want to thank Commissioner Hill for including me in the development of this report and look forward to continued progress in this area.

Yours truly,

Merry E. Bering

Merry E. Bering
Ex. Vice President

Capital Area Science and Math Center
210 Museum Drive, Lansing, Michigan 48933
(517) 487-2276 or 1-800-272-2061
Fax: (517) 487-924

November 3, 1994

Mr. James P. Hill, Chariperson
Environmental Education Task Force
803 North State Street
Alma, MI 48801

Dear Jim,

I have had the opportunity to speak at the Mathematics and Science Center's Network meetings in support of DNR's proposal to place an Environmental Education Specialist and resources at regional Math and Science Centers. Center directors are very excited about the potential blend of Environmental Education, Science, Math, and Technology.

We believe that each center is unique in delivery and audience because of the influence of community members on the mission of each center. In addition, center directors believe that all subjects should be integrated as much as possible. Therefore, the E.E. Specialist at each center will have the advantage of working into a position that dissolves the barriers between Math, Science, Technology, and Environmental Education.

Our next Math/Science Network meeting is December 8th and 9th. Would you please send me any new information about the proposal's status so that I may make a report to The Network. Thank you.

Sincerely,

Pete Vunovich
Director

Regional Mathematics and Science Center
SAGINAW VALLEY STATE UNIVERSITY
7400 Bay Road • University Center, MI 48710 • (517) 790-4114
GREATER SAGINAW VALLEY REGIONAL EDUCATION COOPERATIVE
Walter R. Rathkamp, Director
Carol Shuler, Adm. Secretary

2 November 1994

Mr. James P. Hill, Chairperson
Environmental Education Task Force
803 North State Street
Alma MI 48801

Dear Mr. Hill:

As the Director of the Saginaw Valley State University Regional Mathematics and Science Center, I would like to take this opportunity to express our strong support for the Environmental Education Coordinator Proposal. The Center is firmly dedicated to improving mathematics and science education at the K-12 level. One component of this dedication should be to help teachers and students develop a better understanding of the natural environment that surrounds us. Therefore, I feel the Environmental Education Coordinator Proposal to be a valuable step in that direction and support it fully.

Sincerely,

Walter Rathkamp

Walter Rathkamp

WR/dfb

Regional Mathematics and Science Center
SAGINAW VALLEY STATE UNIVERSITY 7400 Bay Road • University Center, MI 48710 • (517) 790-4114
GREATER SAGINAW VALLEY REGIONAL EDUCATION COOPERATIVE
Walter R. Rathkamp, Director
Carol Shuler, Adm. Secretary

2 November 1994

Mr. James P. Hill, Chairperson
Environmental Education Task Force
803 North State Street
Alma Mi 48801

Dear Mr. Hill:

As the Director of the Saginaw Valley State University Regional Mathematics and Science Center, I would like to take this opportunity to express our strong support for the Environmental Education Coordinator Proposal. The Center is firmly dedicated to improving mathematics and science education at the K-12 level. One component of this dedication should be to help teachers and students develop a better understanding of the natural environment that surrounds us. Therefore, I feel the Environmental Education Coordinator Proposal to be a valuable step in that direction and support it fully.

Sincerely,

Walter Rathkamp

Walter Rathkamp

WR/dfb

Kalamazoo Area
Mathematics and Science Center

Wayne R. Schade, Ph.D.
Director

November 1, 1994

Mr. James P. Hill, Chairperson
Environmental Education Task Force
803 North State Street
Alma, MI 48801

Dear Mr. Hill:

The Kalamazoo Area Math and Science Center (KAMSC) is very excited about the collaborative initiative proposed by the Michigan Department of Education and Department of Natural Resources to provide financial resources and educational materials for an Environmental Education Specialist at the statewide network of regional Math and Science Centers.

We will be especially pleased to participate in this effort as a major delivery system for improving the public's understanding of Environmental Education and for educator staff development within our service area. As we continually strive to provide quality leadership and programs in science and math education for all K-12 students, this is an area that should potentially generate widespread impact in the state of Michigan.

The Kalamazoo Area Math and Science Center stands ready to support and assist with this initiative as a participating agency.

Sincerely,

Wayne R. Schade

Wayne R. Schade, Ph.D.
Director

cc: Keith Harrison
Pete Vunovich

600 West Vine Street • Suite 400 • Kalamazoo, MI 49008-1153 • (616) 337-0004 • Fax (616) 337-0049

KAMSC

Sanilac Intermediate School District

175 East Aitken Road, Peck, MI 48466
Phone (810) 648-4700 - Fax (810) 648-4834

"Recognizing the value and needs of each person, Sanilac Intermediate School District provides quality educational programs and services responsive to an evolving environment."

October 31, 1994

James P. Hill, Chair
Environmental Education Task Force
803 N. State Street
Alma, MI 48801

James P. Hill:

Sanilac Math and Science Center, an entity of Sanilac County Intermediate School District, is in support of DNR and MDE's proposal for Environmental Education Specialists to serve Michigan's counties. Sanilac Math and Science Center (SCSMC)recognizes that the lack of environmental awareness is one of six risks that threatens Michigan's future. Since its conception, SCSMC has taken an active role in implementing an environmental curriculum for K-12 students in the county; an EE specialist would allow SCSMC to carryout its mission.

Sincerely,

Vnona D. Miller, Director
General Education Services

Frederick M. Cady
Superintendent

Vnona Miller
Director
General Education
Services

Hillsdale, Lenawee & Monroe Math/Science Center
2345 N. Adrian Hwy
Adrian, MI 49221
(517) 265-1667

October 24, 1994

Mr. James P. Hill
Environmental Education Task Force
803 North State Street
Alma, MI 48801

Dear Mr. Hill:

I am the new director of the Math/Science Center and a former environmental education consultant for the Muskegon Area Intermediate School District.

I firmly believe that the citizens of Michigan would like to pass on to the next generation an environmental legacy. A legacy rooted in the philosophy that the quality of life is directly tied to the integrity of the environment. In order for us to fulfill this legacy we must help students develop an awareness and sensitivity to the environment. This requires an awareness how the environment functions, how people interact with it and how environmental issues and problems arise and are resolved.

Stewardship of our environment requires a local and global perspective. We need to have environmentally trained teachers in all our schools to aid students in discovering this perspective. The solution to the environmental crisis rests neither with scientists nor with government officials, but with a citizenry educated in environmental problem solving.

I would like to offer my support for the Environmental Education Proposal. If I can be of service, please feel free to call me.

Sincerely,

Tom Green

Tom Green, Director
Hillsdale, Lenawee and Monroe
Math/Science Center

cc: Mr. Keith Harrison

MATH/SCIENCE/TECHNOLOGY CENTER
P.O. BOX 1137, 15760 190th Avenue
Big Rapids, MI 49307

Director: (616) 796-3543 Classroom: (616) 796-5474
Science Van Central . . . Voice: (616) 592-5535 . . . Modem: (616) 592-5540
FAX # (616) 796-3300

October 24, 1994

Mr. James P. Hill, Chairperson
Environmental Education Task Force
803 North State Street
Alma, MI 48801

Dear Mr. Hill,

On behalf of our Intermediate School District and Math/Science Center, I would like to lend our support to the initiative to establish an Environmental Education Specialist at each Math/Science Center.

We are faced with declining public support and funding for environmental organizations while our environmental problems are increasing. Clearly, a strong environmental education program is needed on a continuing basis if we are to maintain the awareness that arose out of Earth Day and has lately begun to wane.

The statewide network of Math/Science Centers, serving every region, is the logical pathway to implement such a program. Our Center stands ready to participate in such an initiative.

Sincerely,

Paul R. Bigford
MSTC Director
M.S., Environmental Interpretation

cc: Keith Harrison

File Envir. Ed.

Livingston/Washtenaw Mathematics and Science Center

1425 W. GRAND RIVER - HOWELL MI 48843
Telephone (517)546-5550 Fax (517)546-7047

CAROLYN HANNUM
Director
SANDRA TROSIEN
Assistant Director

Mr. James P. Hill, Chairperson
Environmental Education Task Force
803 North State St.
Alma, MI 48801

October 24, 1994

Dear Mr. Hill,

I am writing to express my support for the Environmental Education Specialist Initative, as a part of the Relative Risk Task Force Report on Environmental Education. I understand this program would provide an environmental education consultant for each of the 25 Mathematics and Science Centers. This program has the potential to enhance environmental awareness and improve the quality of life for future generations across our entire State.

The goals for the Environmental Education Specialist Initiative would be to:
1) develop a plan with EE goals for students, teachers and the general public.
2) assign MDE and MDNR responsibility for coordinating lifelong learning aspects and ensure local control and input.
3) analyze and evaluate existing EE materials
4) coordinate existing EE programs and training opportunities
5) establish a statewide advisory committee made up of many segments of the population
6) provide balanced and stable funding for ths program.

As a new Center, this program will cetainly assure that environmental issues are an integral part of our programming.

Sincerely,

Carolyn

Carolyn Hannum, Director

cc. Keith Harrison

Mason - Lake - Oceana
Mathematics and Science Center

MATHEMATICS - SCIENCE - COMPUTER TECHNOLOGY

AN EDUCATIONAL CONSORTIUM

October 24, 1994

James P. Hill, Chairperson
Environmental Education Task Force
803 N. State Street
Alma, Michigan 48801

Dear Mr. Hill:

Please consider this letter my support for the Environmental Education Specialist Initiative jointly proposed and supported by the Michigan Department of Natural Resources (MDNR) and the Michigan Department of Education (MDE). It is important for our schools to foster appreciation of our tremendous natural resources, awareness of environmental concerns, and individual responsibility for what happens to our environment. A coordinated effort by MDNR , MDE, Math/Science Centers, and local schools will certainly produce more effective results than would any entity working by itself. In order to provide an environmental education project of the magnitude proposed, centers and schools will need additional funding, particularly to enable them to acquire the services of a specialist in environmental education.

Thank you for considering this worthy proposal.

Sincerely,

Marsha L. Barter

Marsha L. Barter, Director

3000 NORTH STILES ROAD - SCOTTVILLE, MICHIGAN 49454 - PHONE (616) 845-6211 FAX (616) 845-7227

CHITTENDEN EDUCATION CENTER

1070 Nursery Road
Wellston, MI 49689
(616) 848-4858
Fax - (616) 848-4005

Manistee Intermediate School District

Math/Science, Environmental Education, Technology: Keys For The Future

October 24, 1994

Keith Harrison, Director
Environmental Administrative Division/DMB
P.O. Box 30026
Lansing, MI 48909

Dear Keith,

Just a quick note reiterating my support of the Environmental Educators Specialist concept per our recent discussion at Grand Rapids. I agree with the findings of the various task forces that environmental illiteracy poses a great risk to our beautiful state. I also agree that the regional Mathematics and Science Centers are the most logical vehicle for coordinating dissemination of environmental education information.

Rest assured that when this program becomes reality, my Center, serving Manistee and Wexford Missaukee ISDs, will become an active, committed, and involved player.

Again, thank you for the opportunity to meet with you recently and feel free to contact me should you require additional information.

Sincerely,

J. Eric Farfsing

J. Eric Farfsing
Director

JEF/bt

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF MANAGEMENT & BUDGET

P.O. BOX 30026, LANSING, MICHIGAN 48909

PATRICIA A. WOODWORTH, Director

Environmental Administration Division

OCTOBER 19, 1994 PUBLIC MEETING
DRAFT ENVIRONMENTAL EDUCATIONAL TASK FORCE REPORT
COMMENTS

Name: Thomas E. Johnson

Address: 291 6Th Ave.

Manistee, MI 49660

___ I wish to speak, ✓ I do not wish to speak, but I have the following comments:

COMMENTS: I am concerned with the growing lack of exposure our young people have to the processes of nature. This leads to a lack of understanding of our out-of-doors and in turn, a lack of respect for it. Thus as a hunter, fisherman, and outdoorsman, I passionately express my support for the education environmental specialist proposal under consideration.

Written comments may be sent by Friday, October 28, 1994, to:

Keith Harrison, Director
Environmental Administrative Division/DMB
P.O. Box 30026
Lansing, MI 48909
Phone: (517)-335-3666
Fax: 517-335-1575

-Members of Michigan's Natural Resources Commission,
-Chairman DeVuyst,
-My name is Peter Vunovich, Director of the Capital Area Science and Math Center in Lansing, Michigan. I am speaking for the Michigan Mathematics and Science Centers in support of the Environmental Education Task Force Report.

For too long, environmental education has worn the labels of "warm" and "fuzzy" and "abstract" and "vague" and "left wing" and on and on. That time is over. Curricula and lessons in environmental education are now every bit as sophisticated as those in the traditional sciences. Public awareness of the importance of environmental education has been heightened. Everyone, regardless of political persuasion, realizes that it is essential that young people today functionally understand the environment that will sustain them in the future. Students will not gain hands-on, collaborative, authentic, problem-solving experiences solely by watching "Nature" on Public TV or by visiting a local environmental center. What Michigan needs is a concerted effort in the schools to improve students literacy about the environment.

Proper environmental education includes real world application of science and mathematics integrated with social studies, history, art, and agriculture. We have good materials to work with. We need people to do the work.

Funding for an environmental education specialist at regional mathematics and science centers makes sense because it:

- will ensure equitable access through regional delivery *
- will help ensure that environmental education is linked with mathematics and science (interdisciplinary)
- will be able to adjust to regional needs and interests
- will assure that everyone receives the same information
- will use the existing Math/Science Network
- will make environmental education resources available to public and private organizations and schools
- will join with community partnerships, business and industry already in place at the Centers
- will assist in advancing the teaching and learning of environmental education using Michigan's Core Curriculum Requirements
- will utilize the Centers for regional environmental education conferences and training sites.

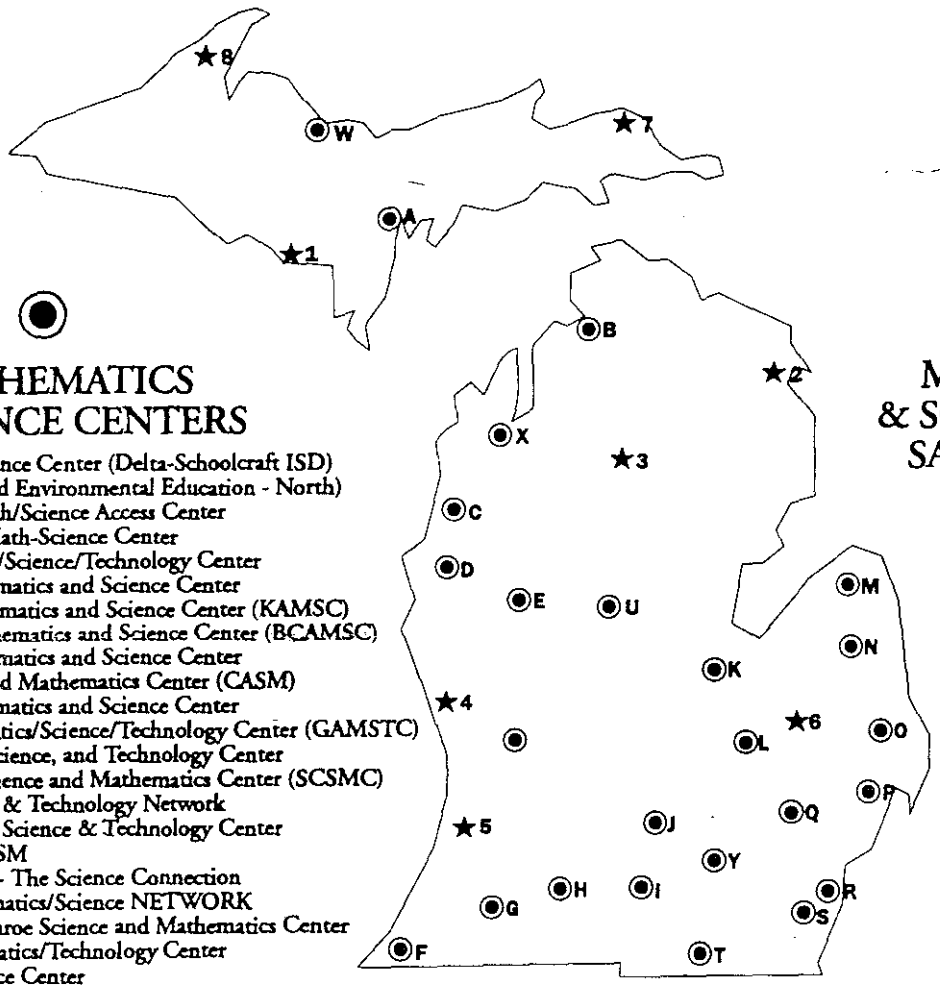
12/7/94

* See Map of Centers

MATHEMATICS AND SCIENCE CENTERS IN TODAY'S SOCIETY

Today's changing society and the dynamics of our economy demand that the education community significantly improve the mathematical power and scientific literacy of our citizens. What is taught and what is learned must not be based on the superficial transmission of knowledge. Rather, our premise should be that science is a process for answering questions about the world and mathematics is a language for describing patterns and order in the world.

Michigan stands out in its response to the call for reform. The Michigan Legislature supports the improvement of mathematics and science learning and teaching through the Mathematics and Science Centers Program. This Program provides funds for 25 Centers and eight satellites around the state.



MATHEMATICS & SCIENCE CENTERS

- A Northwoods Math Science Center (Delta-Schoolcraft ISD)
- B SEE-North (Science and Environmental Education - North)
- C Manistee Regional Math/Science Access Center
- D Mason-Lake-Oceana Math-Science Center
- E Mecosta-Osceola Math/Science/Technology Center
- F Berrien County Mathematics and Science Center
- G Kalamazoo Area Mathematics and Science Center (KAMSC)
- H Battle Creek Area Mathematics and Science Center (BCAMSC)
- I Jackson County Mathematics and Science Center
- J Capital Area Science and Mathematics Center (CASM)
- K SVSU Regional Mathematics and Science Center
- L Genesee Area Mathematics/Science/Technology Center (GAMSTC)
- M Huron Mathematics, Science, and Technology Center
- N Sanilac County ISD Science and Mathematics Center (SCSMC)
- O St. Clair Math, Science & Technology Network
- P Macomb Mathematics, Science & Technology Center
- Q Oakland Schools - PRISM
- R Detroit Public Schools - The Science Connection
- S Wayne County Mathematics/Science NETWORK
- T Hillsdale-Lenawee-Monroe Science and Mathematics Center
- U CMU Science/Mathematics/Technology Center
- V GVSU Math and Science Center
- W The Seaborg Center - Northern Michigan University
- X Grand Traverse Area Regional Mathematics, Science, and Technology Center
- Y Livingston-Washtenaw Math/Science Center

MATHEMATICS & SCIENCE CENTER SATELLITE SITES

- 1 Dickinson-Iron ISD
- 2 AMA/Iosco
- 3 COOR ISD
- 4 Muskegon ISD
- 5 Allegan ISD
- 6 Lapeer ISD
- 7 Eastern UP ISD
- 8 Copper Country ISD

As of October 1, 1994

For more information about the Center serving your area, contact the Curriculum Development Unit at the Michigan Department of Education, P.O. Box 30008, Lansing, Michigan 48909, or telephone 517-373-1236.

Testimony of Kevin Frailey,
Environmental Education Director,
Michigan United Conservation Clubs,

on behalf of the Michigan Relative
Risk Task Force Report on Environmental
Education.

Natural Resources Commission, December 7, 1994
Bloomfield Hills, MI

It was eight years ago that I also had the opportunity to speak to the Natural Resources Commission in regards to Environmental Education. We've all heard the expression, "the more things change, the more they remain the same." In those eight years the Commission has changed over completely but leadership from our state agencies, in regards to environmental education has remained the same.

I was not sure if I wanted to be associated with the Relative Risk Task Force on Environmental Education when I was first asked to serve. I had just finished serving on the Environmental Education Citizens' Advisory Committee and we had issued a very detailed report on the state of environmental education in Michigan. It seemed a time of action, not further study. Yet I agreed to serve on the new task force and soon I saw a different type of report unfolding.

I also thought that the timing could not have been better. There was momentum in environmental education since the passage of the Environmental Education Act. Although the new study and the previous study had much in common, the opportunity for state agency commitment was better detailed. Back in 1989 the Michigan Department of Natural Resources and the Michigan Department of Education signed a memorandum of understanding in regards to their future committment to environmental education. These are the two agencies responsible for environemntal education leadership in nearly every other state in this country. The Relative Risk Task Force gives these agencies the formula to pick up the ball and run with it. Here is a great opportunity for parnership!

The Task Force report calls for environmental education specialists to be placed at each of Michigan's 25 Math and Science Centers, a responsibilty shared by the MDNR and MDE. These specialists can carry out the teacher training and community programs that we need to create the environmentally literate citizenry we lack according to the Relative Risk Report.

Training is the key component in this program. These specialists must be shown the environmental education resources and curricula that currently exist and be trained to use each. Furthermore, they must be encouraged to use science based materials and not material which has been based on emotional appeal.

Environmental education is a huge umbrella which contains nature study, conservation education, outdoor education, and much, much more. The Michigan United Conservation Clubs has the most popular, extensive, and distinct environmental education programs in the state. From hunter safety to solid waste education, our programs run the whole environmental education spectrum. Although we feel our impact is important, we cannot do it alone.

" We can all have an important part in the plan for the future of environmental education in Michigan. It's a challenge none of us , nor any of our children, can afford to neglect or forget." That's from Michigan Out-of-Doors Magazine, March 1973

"and be it further resolved, that the public schools of Michigan be encouraged to provide environmental education programs utilizing to fullest extent the assistance available to them from governmental sources." That was from the Michigan Association of School Administrators in January 1972.

"During the next 10 years we will take - or fail to take - the actions which will determine whether people will inhabit the Earth very far into the future." That was from Ralph A. MacMullan, director MDNR in 1970..

All three of those passages were used in Governor Milliken's study of environmental education in 1973. We are all in this together!